Straight Shooters

Adventures with numbers

★ Level 5 Arithmetic ★

Why STRAIGHT SHOOTERS makes your . . .

teaching MORE EFFECTIVE and

produces BETTER RESULTS in your arithmetic classroom

The teaching program in Straight Shooters was tested and proven in actual school classrooms before publication. Both authors, Doctor Jesse Osborn and Adeline Riefling, are engaged in teaching children. They devoted fourteen years to the preparation and testing of every element present in this program. The features you get will make your own instruction more effective, easier to administer and more pleasant for everyone.

THE LEARNING PROGRAM — Presentation, practice, re-teaching, and review. There is a very definite, simple, psychologically sound pattern followed in presenting all material in Straight Shooters.

		Example
1st	The antecedent process is reviewed	p. 100
2nd	The new process is introduced	p. 104
3rd	It is followed immediately with practice involving the new skill	pp. 104-111
4th	The process is then re-taught	p. 112
5th	More practice follows	pp. 113-116
6th	It is maintained and reviewed from that time forward	pp. 123, 124, 126, 127

In Straight Shooters no process is ever introduced, then dropped, or taught but not practiced.

TESTING AND SPECIAL ASSISTANCE WORK — Every unit of work in Straight Shooters closes with first, a diagnostic test (for example, page 215). Pupils revealing a need for remedial work in the diagnostic test will find this provided on the next page (page 216). For pupils of superior achievement there is a page of more difficult material (page 217). New processes are never introduced on this page. Then for your final measure, an achievement test completes the unit (page 218).

PRACTICE — Straight Shooters gives you 9613 separate practice problems.

MEANINGFUL ARITHMETIC CHILDREN UNDERSTAND — All skills and processes in Straight Shooters are explained in terms meaningful to

ten year olds. This is possible because extensive classroom tests revealed clearly just what children at this level could understand and what they couldn't. Meanings too difficult for fifth grade youngsters have been excluded from Straight Shooters.

A PROGRAM CHILDREN ENJOY — Straight Shooters presents arithmetic that children really enjoy. Explanations as well as problem content are all based upon things that interest ten year old children. The computational needs of fifth grade children form the material used in problem solving (glance over pages 54, 81, 177, 193).

In addition, interest-building devices used for years to add sparkle to basic readers brighten your arithmetic program for the first time. The range firing theme, which all fifth graders love, gives continuity and interest to your testing and special assistance pages. It gives this text its name. It is not used often enough, however, to lose its motivating force. Special games, races and group activities add life and sparkle to practice and daily work.

ARITHMETIC CHILDREN CAN READ — Too often learning in arithmetic is impeded by too difficult reading material. This problem has been eliminated in Straight Shooters. All elements contributing to reading difficulty have been rigidly controlled. So successfully has this been done that Straight Shooters measures only 5.3 when tested with the Lorge Readability Index Formula.

COLOR THAT HELPS YOU TEACH — Color is used in Straight Shooters not only to make it the most attractive fifth grade arithmetic text, but more important, to help you teach. You find examples of new skills spotlighted in red, the important elements in a new process set out in color. As one child put it, "The red print tells me to stop, look, and listen."

TYPE THAT'S EASIER TO READ — Both Straight Shooters and the famous Snellen Eye Chart are set in the same type. Its superiority has been proven by extensive laboratory tests. Dr. Matthew Luckiesh, famous vision expert, found, by test, that numbers used in Straight Shooters are 50% more readable than those in the other arithmetics tested and the running words 20% more readable. This feature will greatly reduce eye strain and errors caused by faulty identification.

STRAIGHT SHOOTERS • Grade 5

List price $1.68 (Subject to usual school discount). Available also are teacher's manuals, answer books and workbooks.

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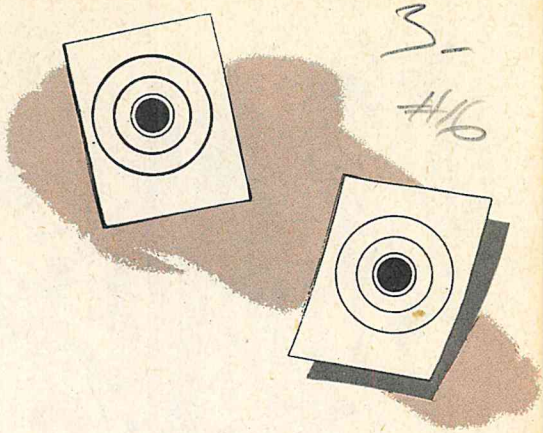
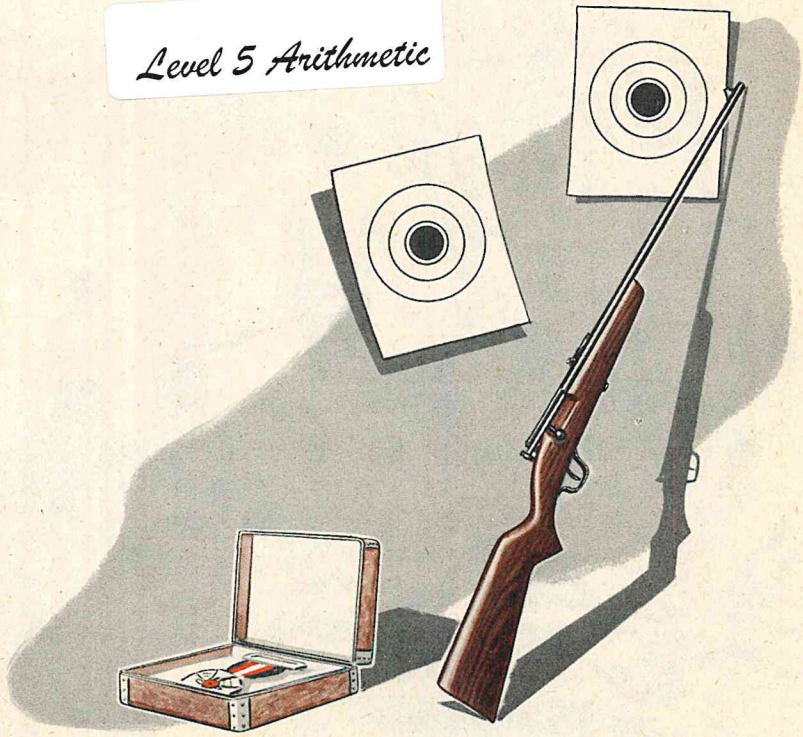


Straight Shooters

Level 5 Arithmetic



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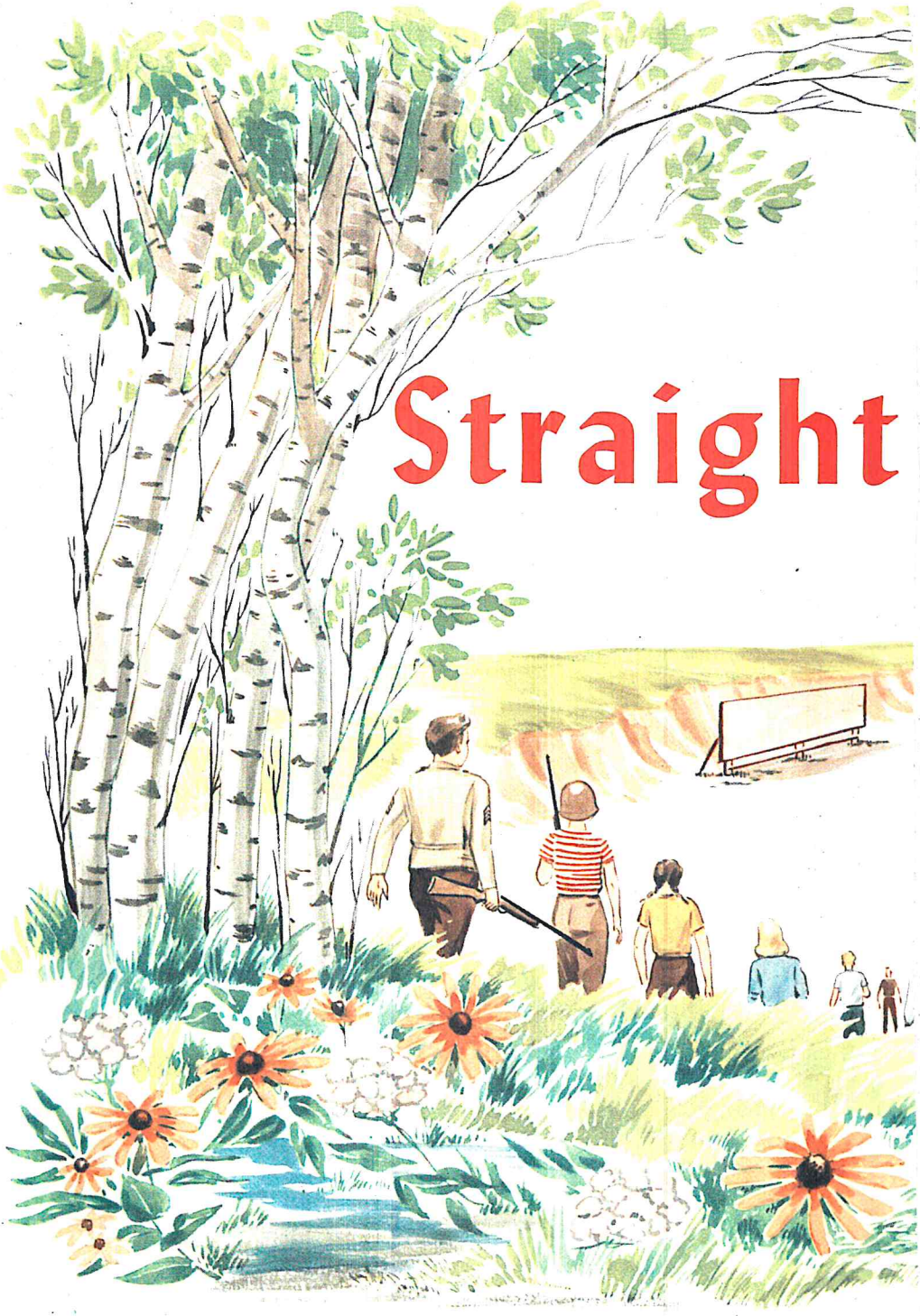

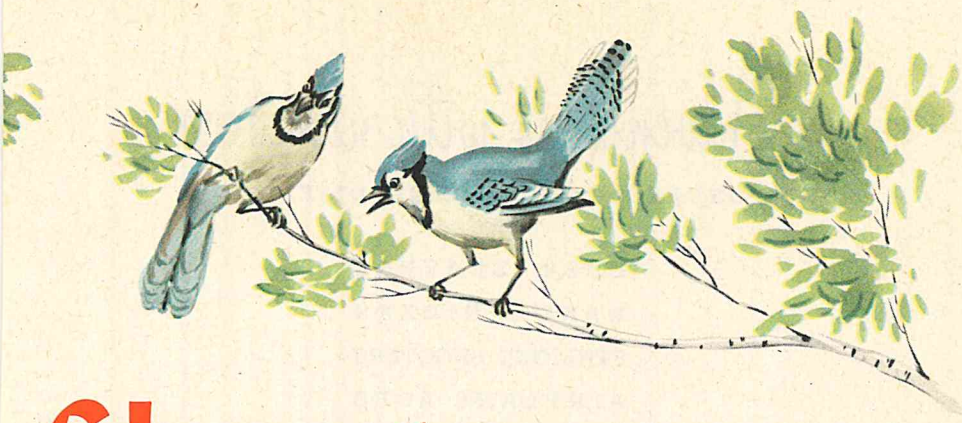

Shooters

Adventures with numbers

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★ ★ ★ ★ ★

Webster Publishing Company

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Adventures with numbers

IN ORDER OF INCREASING DIFFICULTY

BUSY BEAVERS
RANGE RIDERS
STRAIGHT SHOOTERS
AIRPLANE ACES
HOME RUN HITTERS
CAGE CHAMPIONS

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★ Preface

Plan of Series. Adventures with Numbers is unique in organization. Each book has a motif taken from the pupils' world and captivating to the pupil. The motif furnishes the book's title. Young learners assume the role of Busy Beavers or Range Riders as they experience adventures with numbers. The boy or girl who is a little older plays that he is on the rifle range or piloting a plane as he gains further skill and understanding. The upper grade pupil takes part in a make-believe ball game, the rules and the scores of which provide motivation and sliding measures of achievement. Emphasis is placed on crediting the pupil with what he does correctly, without undermining his confidence when he fails to make a perfect total score, or the hypothetical 100%.

Unit Organization. Each book is divided into twelve units, each unit a little book in itself, with presentation of new material, practice in computation, and helps in problem solving. Pages of races, drills, and problems, with like captions and illustrations, occur in each unit of a book. The four closing pages of a unit are:

a. Test on material of unit, with a goal.

b. Helps for those who failed to reach goal a.

c. Challenges for those who did reach goal a.

d. Final unit test, geared to average pupil.

The first and seventh units of each book are given largely to reviewing and reteaching. Thus, twice a year, there are systematic campaigns to strengthen foundations so that the pupil can go into new work with new confidence, even though there have been gaps in his earlier work.

Non-Discriminating Differentials. Careful provisions are made for pupils with different learning rates. This is done in such a way as not to foster a superior attitude on the part of the fast learner nor to embarrass the one who learns slowly. Among the beavers, one who mends the wall can take as much pride in his work as the one who builds it higher. In basketball, one who recovers the ball is as valuable to the team as one who passes the ball. There is no higher nor lower with the pupil who does his best with the work that is appropriate for him. In Adventures with Numbers, there is differentiation without discrimination.

Individualized Program. Directions are addressed to pupils. Pupils are asked to choose partners, or to divide into groups or teams to do specific tasks.

They mark each other's papers and go on to the next task. This builds up a feeling of responsibility on the part of the pupil, and helps to release the teacher from constant direction of the class so that she can give help where it is most needed. The range between the slow learner and the fast learner in the average class is great. This series provides material and a plan so that the teacher can guide each pupil along at his own rate, rather than merely "covering" the material judged appropriate for the average pupil.

Readiness. Experience and experiments show that pupils do not become ready of themselves. We also know that teaching is wasted when the pupil is not ready. A program of preparing the pupil for each next step is skillfully woven into Adventures with Numbers. The «times-and» facts precede carrying in multiplication; station numbers precede uneven division. A boy's bicycle repair shop grows into a partnership and into a small corporation before stocks and bonds are presented. No process or idea is introduced until the pupil has been conditioned for it.

Presentation of New Concepts. Meanings, skills, and processes that are most difficult for the child to grasp are usually the ones that are most difficult to present clearly in a text. An author is tempted to be satisfied with something that he knows is inadequate, and to hope that teacher and pupil can fill in what is lacking. In Adventures with Numbers, no effort has been spared to present each new idea clearly and adequately. A pupil is not stopped today by the height of the ultimate goal in arithmetic, but by some little point in today's lesson that is not clear to him. Our presentations make the steps short and leave no gaps.

Using Arithmetic. A pupil may excel in book computation or book problems, and fail to see that the purpose of what he learns in school is to help him outside of school. He fails to carry what he learns in the little world within the school to the big world on the outside. Adventures with Numbers guides the pupil to the use of arithmetic in his everyday affairs, and helps him see arithmetic as a part of his whole self and not just a part of his school self.

Importance of Arithmetic. Quantitative thinking plays a more decisive role in our age than ever before. This is an age of number, measurement, science, and technology. The pupil who leaves school deficient in arithmetic is blocked from entering many fields. He will be handicapped in his efforts to earn a good living, or to buy most with what he does earn. For the individual who will carry his load and for the nation, arithmetic is truly an important part of the education for survival.

★ ★ ★ ★ ★ Contents

Unit 1. Pages 1–24

Reading and writing numbers to nine digits. The 100 addition facts, and practice in adding. Adding dollars and cents. Using rounded numbers.

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Roman numerals. The 100 subtraction facts, and practice in subtraction. Subtracting dollars and cents. Magic squares. Using rounded numbers in subtraction. Multiplication facts and practice.

Unit III. Pages 51–76

Building skill in problem solving. Multiplication with one, two or three figure multipliers. Steps in division.

Unit IV. Pages 77–108

Two-step problems. Division with remainders. Checking division. Using two figure divisors.

Unit V. Pages 109–138

Steps in division, using two figure divisors. Helps in finding the correct quotient figure. Division practice and problems.

Unit VI. Pages 139–164

Using time, liquid, weight, temperature, counting, and length measures. Using fractions. Problem solving.

Unit VII. Pages 165–192

Wholesale and retail buying. Practice with two figure divisors. Graphs. Drawing to scale. Finding perimeters of squares and rectangles.

Unit VIII. Pages 193–218

Learning more about fractions. Adding like fractions. Reducing fractions to lowest terms. Changing improper fractions to wholes or mixed numbers.

Unit IX. Pages 219–244

Multiplying with fractions and mixed numbers. Adding unlike fractions and mixed numbers. Writing remainders in division as fractions.

Unit X. Pages 245–270

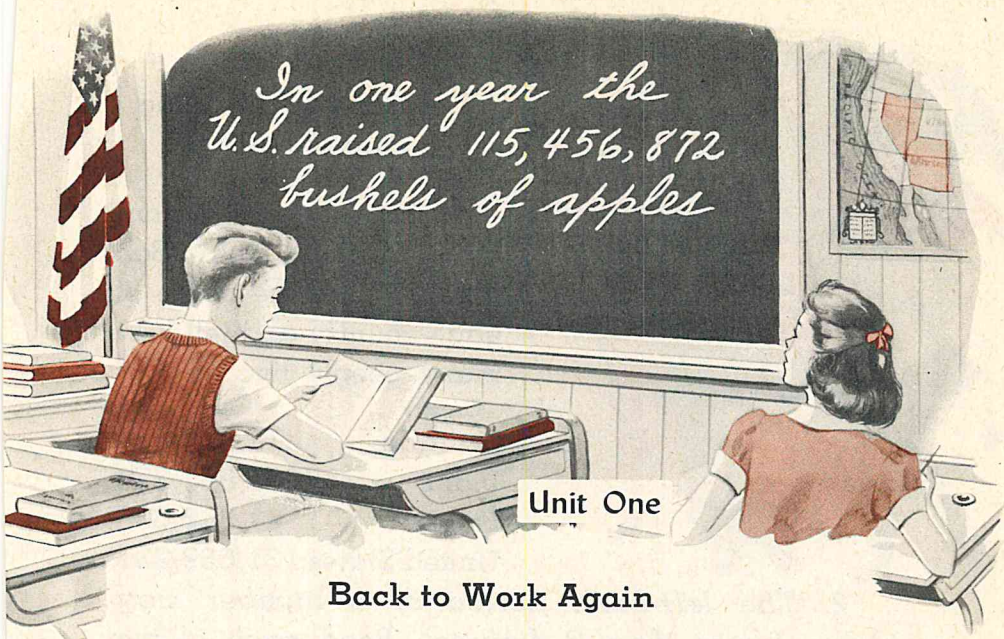
Making change. Subtracting like and unlike fractions. Subtracting fractions or mixed numbers from whole numbers, subtracting mixed numbers.

Unit XI. Pages 271–296

Finding perimeters and areas of squares and rectangles. Learning about tenths and hundredths. Adding and subtracting decimals.

Unit XII. Pages 297–322

Adding and subtracting decimals. Comparing common fractions and decimals. Multiplying and dividing dollars and decimals. Making graphs. Practice and problems that review the year's work.



Unit One

Back to Work Again

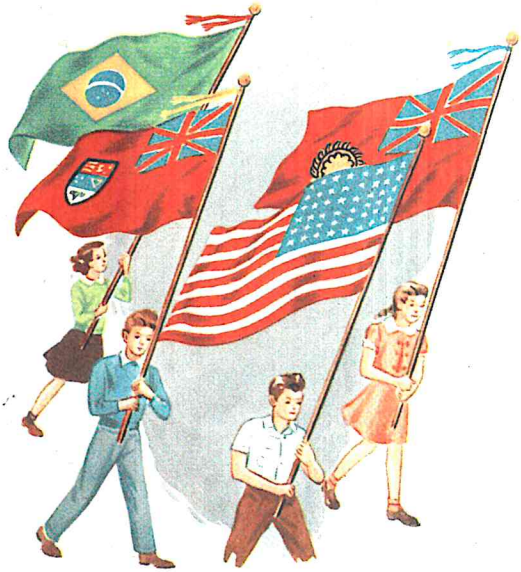
Bob is looking at some of his new books. He has found a long number which he cannot read. His teacher told him to copy the number on the blackboard.

Notice how Bob has used commas to separate or **point off** the long number into groups of 3 figures each. These groups are called **periods.** It is easier to read a large number if it is **pointed off** into **periods.** This is the way the periods are named:

Million	Thousand	Units or Ones
115 ,	456 ,	872

To read Bob's long number you say,

115 million 456 thousand 872.



Reading and Writing Long Numbers

1. Here are some more long numbers that Bob found. Read the name of each country and tell how many people live in it.

Country	Population
Canada	11,419,896
India	352,837,778
Brazil	41,356,605
United States	131,669,231

2. *The left-hand period of a number may have fewer than 3 figures.* Read each of the numbers again and tell how many figures there are in the left-hand period.

It is easy to point off long numbers into periods if you use this simple rule.

Begin counting from the right. Place a comma to the left of each group of 3 figures.

3. Are the numbers below pointed off correctly?

15,769,240 6,255,28 9,237,511

Copy the following numbers on the blackboard. Point them off into periods, and read.

	a	b	c	d
4.	4789578	186439607	542827	3421968
5.	645372	10429344	420538941	11240000
6.	10000010	300536241	402000210	90000000

Three Ways of Writing Long Numbers

I. A number may be written with figures only, as 216,320,945.

II. It may be written in figures and words, as 216 million 320 thousand 945.

III. It may be written with words only, as two hundred sixteen million, three hundred twenty thousand, nine hundred forty-five.

Write these numbers in figures. Point off correctly:

	a	b
1.	71 million 915 thousand 627	6 million 500
2.	328 million 805 thousand 900	18 million 2
3.	200 million 827 thousand 728	8 thousand 16
4.	52 million 500 thousand	2 million 8

Read these numbers aloud to the class. Then write them in figures and words on the blackboard.

	a	b	c
5.	4,300,328	29,586	84,000
6.	437,001	815,205	602,006
7.	3,772,614	17,840,235	637,000,001
8.	342,458,100	500,124,305	897,211,030

Copy these numbers. Point off into periods. Then read the numbers to your class.

9.	427317	920300030	581203000
10.	47831121	52066666	200000020
11.	100000005	92730	498210
12.	452134	9023111	13678003

13. Write all the numbers given in examples 5 through 12 on the blackboard, using words only.

A Hunt for Long Numbers

Bob's teacher told the class to hunt for interesting facts in which long numbers were used. Here are some of the facts. Can you read the long numbers?

1. North America covers 9,439,000 square miles.

2. There are 167,759,000 people in North America.

3. In one year the United States raised 421,067,000 bushels of potatoes.

4. The sun is 1,300,000 times as large as the earth.

5. In one year the world produced 35,365,000 tons of sugar.

Join the Long Number Hunters

Look in newspapers, magazines, and books for long numbers of three periods. Write some of them on the blackboard to be read aloud.

Yes-No Game

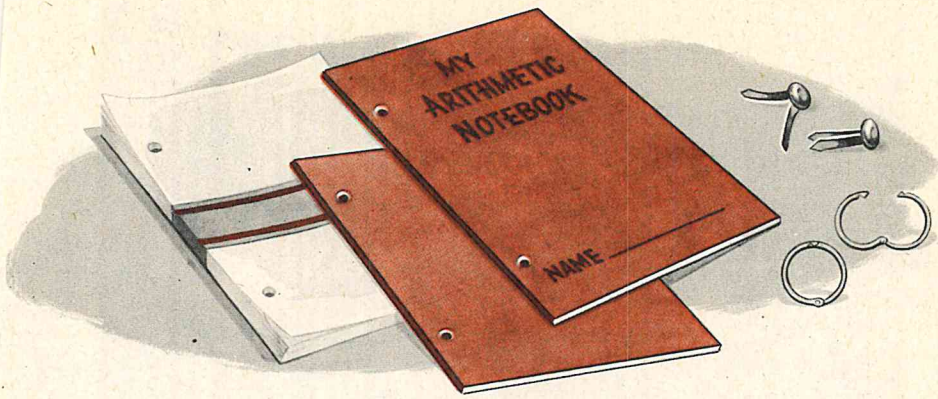
Write the letters a—d in a column on a piece of paper. If what is said is true, write "Yes" after the letter. If what is said is not true, write "No."

a. I would rather have $164,479.34 than $25,456,008.

b. A man who has $564,732 is worth a million dollars.

c. The third period from the right tells how many millions are in the number.

d. Every period in a number must contain 3 figures.



Making an Arithmetic Notebook

Use heavy paper for covers. Cut a front and a back cover each measuring 9 inches by 12 inches. A shorter way to write "9 inches by 12 inches" is 9″ × 12″. The sign ″ means inches.

Place a dozen or more sheets of 9″ × 12″ plain paper between the covers. Use paper fasteners or notebook rings to hold your notebook together.

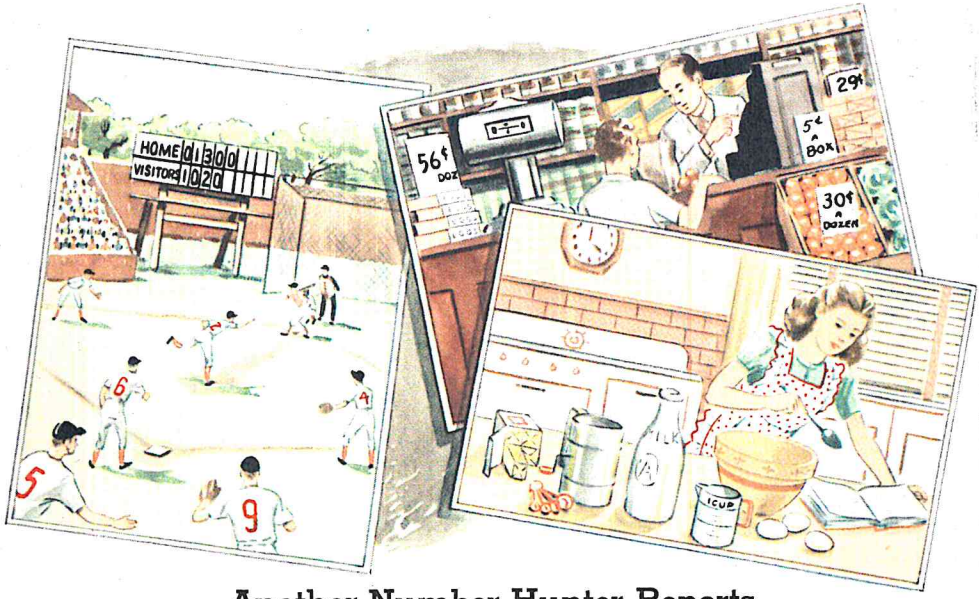
You can put many interesting facts and pictures in your notebook. Begin with these.

1. Find the population of the ten largest cities in the United States. Write the name and population of each of these cities in your notebook.

2. Find out how many people live in your town or city. Would you say that you live in a large city?

3. Write the names of the Great Lakes. After each write the area in square miles.

4. Which is larger, Lake Superior or the state of South Carolina?



Another Number Hunter Reports

Tom looked for some pictures showing persons using numbers. He has pasted them in his notebook.

1. Tell how numbers might be used in each of these pictures.

2. Find other pictures in which arithmetic is used. Paste them in your arithmetic notebook.

3. Make a list of ten ways in which your family uses arithmetic.

4. In what ways would a builder use arithmetic if he built you a house?

5. If you worked in any of the following places, how would you find use for arithmetic?

hospital	bank	post office	city hall
theater	farm	drug store	shoe store

A Word to the Wise

Since arithmetic is so important in everyday life, you will be very wise if you practice your number combinations until you know them well.

1. Cover the answers and see how fast you can add these "doubles."

2	4	3	1	7	9	5	8	6
2	4	3	1	7	9	5	8	6
4	8	6	2	14	18	10	16	12

"Doubles" often help you in addition. If you cannot remember the sum of 8+9, think of the **"double"** of the **smaller number.** Since 8+8=16, then 8+9 is 1 more than 16, or 8+9=17.

2. Tell what "double" you think of when you add each of the following. Then see how fast you can give the sums.

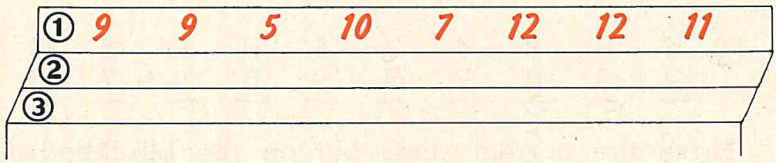
4	5	8	7	7	6	6	5	9
3	4	9	8	6	5	7	6	8

A Real Time-Saver

It will take too long to copy the examples in addition practice. Use the "folded paper method" shown below, writing the answers only.

1.

3	7	2	9	3	7	8	5
6	2	3	1	4	5	4	6



The 100 Simple Addition Facts

Use folded paper. Write the sums.

1.	2	3	4	0	6	8	8	6	1	9
	4	0	5	8	0	3	2	4	4	1
2.	5	6	3	4	1	7	2	2	2	4
	0	6	2	3	5	1	9	5	8	4
3.	4	3	4	1	9	7	2	6	5	3
	1	1	0	8	9	7	0	1	4	3
4.	1	9	8	1	1	1	2	2	5	0
	1	2	8	3	6	7	1	2	5	0
5.	8	0	7	1	0	8	6	0	3	0
	7	1	2	9	5	1	2	4	6	2
6.	8	1	5	4	1	5	0	0	5	7
	0	0	2	2	2	3	3	5	1	0
7.	3	3	3	2	3	6	7	2	8	4
	8	4	9	3	5	3	3	7	4	8
8.	8	7	5	9	6	6	5	7	8	9
	5	9	8	7	8	9	7	8	7	8
9.	4	7	7	9	3	9	2	9	0	6
	6	6	4	6	7	0	6	3	6	5
10.	5	8	8	4	7	4	9	9	6	5
	9	9	6	7	5	9	5	4	7	6

Have the correct sums put on the blackboard.

Keeping in the Game

When the coach finds a player too weak for the game, he gives the player special "workouts" to make him strong. Maybe some of you had to be carried out of the game after checking the answers you wrote on page 8. We have some adding workouts all ready for you. Take these workouts and you will become strong.

First Addition Workout

Write the sums on folded paper. Keep practicing until you can give the sums quickly.

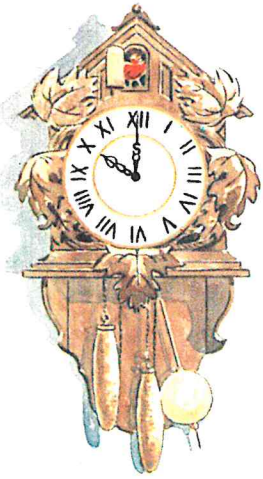
1.	2	2	1	3	1	4	6	4	1	1
	2	1	4	3	6	1	1	4	2	7
2.	5	1	3	7	3	1	2	1	4	2
	5	3	2	1	1	5	3	8	5	4
3.	5	7	8	5	4	1	2	3	2	3
	1	2	1	4	2	9	5	6	8	4
4.	4	8	6	5	9	6	5	7	2	3
	3	2	3	2	1	2	3	2	6	5

Is the workout helping you get stronger?

Second Addition Workout

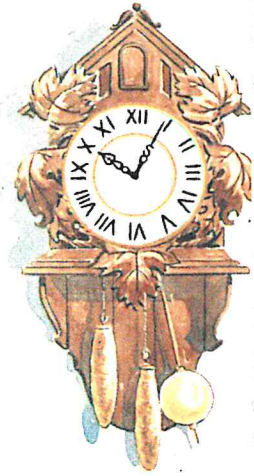
When you find you are getting too strong for the first addition workout, practice this one.

1.	6	2	8	3	4	9	3	7	5	4
	6	9	8	9	8	9	8	7	6	7
2.	6	7	5	6	4	8	6	5	7	5
	7	8	7	8	9	9	9	8	9	9
3.	9	9	0	8	9	9	9	8	7	8
	6	5	8	7	5	4	8	7	5	6
4.	2	3	4	7	3	7	5	9	4	6
	9	9	8	0	8	7	6	0	7	7



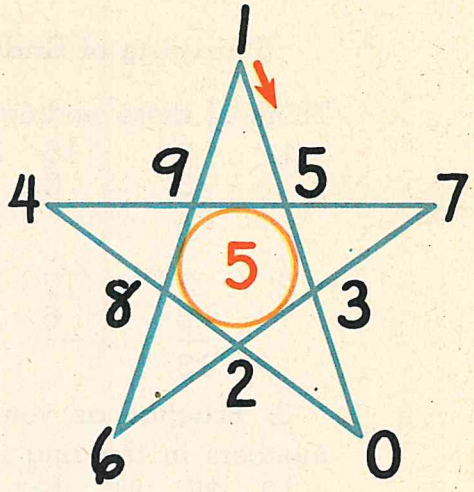
Play "Beat the Clock"

Try running a race with the clock. Turn to page 8. Write the sums as quickly as you can. If you finish within 4 minutes and all are right, you beat the clock. If you do not finish in 4 minutes, or all are not right, the clock wins.



Write in your notebook all the addition facts you have missed. Also write the correct answers. Practice saying the facts faster and faster.

This Game Makes Strong Players



Draw a star on the blackboard. Number it as in the book. In the ring inside the star, write one of the numbers:
5 3 0 6 7 4 8 2 9 1
Choose some boy or girl to be "pointer." He or she must be able to add well to be a good pointer. To add well one must know the 100 addition facts on page 8.

The pointer points to a number outside the star and calls a pupil's name. The pupil must answer quickly giving the sum of the number pointed to and the number inside the star. A good pointer makes the game go quickly.

When everyone is getting right answers, put a different number in the ring inside the star and choose another pupil as pointer.

Leave the star on the blackboard for several days. Practice a few minutes each day. You can work alone writing the sums on your paper. Have a friend check your answers. In a little while, every pupil will know the 100 addition facts well.

Thinking of Endings Will Help You Add

Think of these endings. Say the sums quickly.

1.	5	15	25	35	65	85	95	45
	3	3	3	3	3	3	3	3
	8							
2.	7	17	37	27	57	97	67	47
	6	6	6	6	6	6	6	6
	13							

3. Practice as you did on page 11. Use these numbers in the ring inside the star:

12 25 41 28 24 17 46 39 53 20

Remembering What You Have Learned About Adding

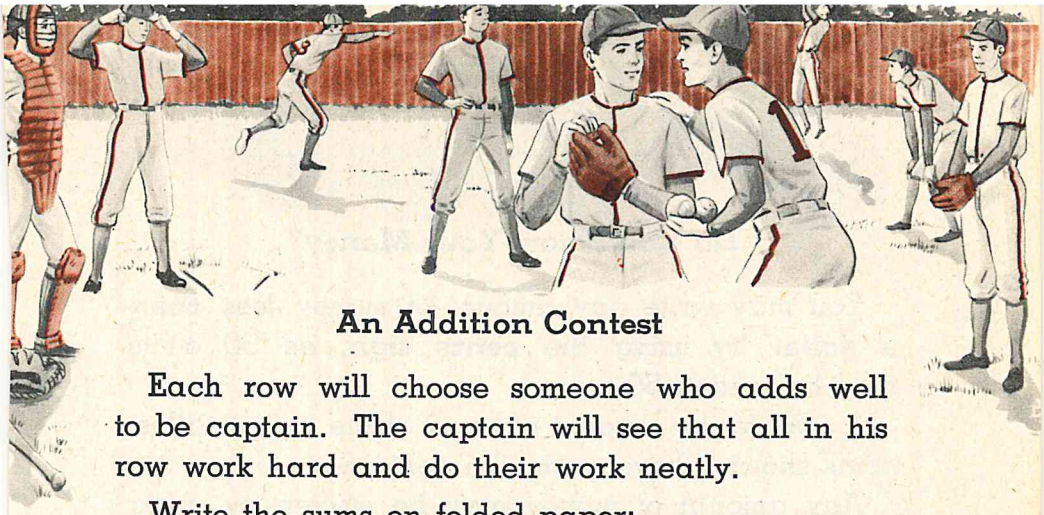
Each number added is called an **addend.** The answer is the **sum.**

24 addend
46 addend
70 sum

Add		Check		Add
7	*Think*	*7*	*25* ↑	*46*
5	*12* ↓	*5*	*18*	*58*
8	*20* ↓	*8*	*13*	*77*
5	*25* ↓	*5*	*Think*	*94*
25		*25*		*275*

1. To find the sum of 7, 5, 8, and 5, add down. Check by adding up.

2. Find the sum of 46, 58, 77, and 94. The sum of the ones column is 25. You write the **5** under 4 and carry the 2. The sum of the tens column, with the 2 carried, is 27. Write **27** as shown. The sum is **275**. **Check by adding up.**



An Addition Contest

Each row will choose someone who adds well to be captain. The captain will see that all in his row work hard and do their work neatly.

Write the sums on folded paper:

1.

73	51	28	30	54	91	70	63
24	27	50	62	83	68	85	50
97	78	78	92	137	159	155	113

2.

49	28	16	84	57	66	78	46
32	47	55	19	95	79	62	57
81	75	71	103	152	145	140	103

3. 12+7=19 11+8=19 16+5=21 17+7=24 12+9=21

4. 15+7=22 18+5=23 23+4=27 24+8=32 37+6=43

5.

					7	7	6	9	8
3	6	4	5	6	1	4	0	7	9
2	1	2	4	3	4	4	3	5	7
4	0	1	3	5	5	6	8	9	7

6.

							876	76
			570	7,869	8,702	43	39	
	984	63	4,853	639	492	59		
478	87	982	7,982	48	865	55		
525	634	739	6,054	750	98	27		

26,758

The captain will collect and mark the papers in his row. The answers are on page 15.

Do You Know Your Money?

You may write any amount of money **less than a dollar** by using the **cents sign,** as 50 cents may be written 50¢.

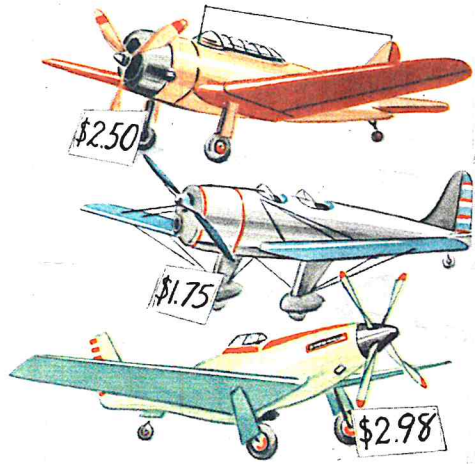
1. Write the amount of each of the four smallest coins shown above using the cents sign.

Any amount of money may be written by using the **dollar sign** and **cents point,** as $.50 (fifty cents), $1.00 (one dollar), $1.50 (one dollar and fifty cents).

The correct name for the "cents point" is "decimal point," and now that you are in the fifth grade you will call it **decimal point.**

A decimal point is used with the dollar sign to show parts of a dollar. Read the decimal point as "and."

2. Read the cost of each plane in the picture. Write the cost using dollar sign and decimal point.



3. Read these amounts of money:

$1.42	$112.53
$42.31	$.01
$31.22	$30.03
$.25	$1,245.35

Adding Dollars and Cents

In adding amounts of money, be sure to keep the decimal points exactly under each other in a straight column.

Copy these numbers on the blackboard and add them:

1. $4.25, $1.06, $3.32 **3.** $52.00, $7.11, $16.07

2. $0.46, $3.18, $2.95 **4.** $16.28, $3.49, $35.17

Before you can add cents to dollars and cents, all amounts of money must be written with the dollar sign and decimal point. Write these numbers ready for adding and add.

5. $4.10, $.25, 95¢, $23.15

Practice in Reading Numbers

Stop! Do not say "and" at all in reading whole numbers. Read these whole numbers:

6. 68,452 2,874,596 295,386,045

Go! Say "and" between dollars and cents, for a decimal point is read as "and." Read these numbers:

7. $45.01 $4,253.45 $402.10

8. $125.58 $432,546.00 $243,465,234.18

Answers to the Addition Contest on Page 13

1. 97 78 78 92 137 159 155 113

2. 81 75 71 103 152 145 140 103

3. 19 19 21 24 21

4. 22 23 27 32 43

5. 9 7 7 12 14 17 21 17 30 31

6. 1,003 1,705 2,354 26,758 10,139 2,374 256

Everyday Uses of Addition

1. Add and check these bills for Ellen's father:

Gas	Electric	Coal	Meat	Laundry
			$0.94	$1.60
	$1.84	$23.25	.63	3.45
$2.46	.98	7.91	.78	.93
1.93	3.19	16.10	.55	3.13

Ellen's teacher gave her these numbers to add. Copy them neatly and add:

2. 76, 18, 47, 39

3. 324, 81, 143, 72

4. 181, 7, 18, 4

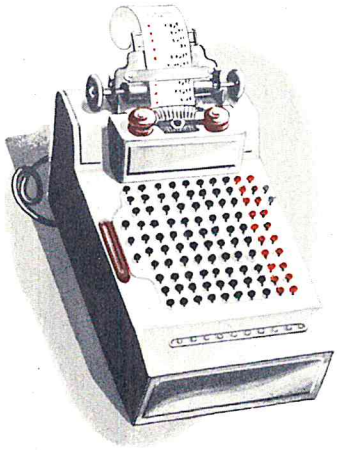
5. $16, $24, $30, $52, 98¢

6. $1.31, $0.98, $4.25, $0.09

7. $7.20, $13, $.84, $1.43

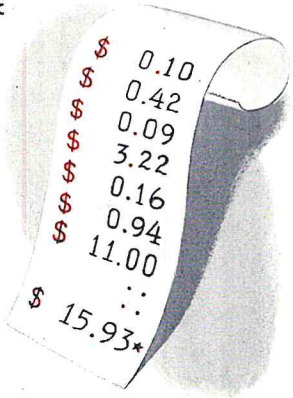
8. Ellen earns money caring for small children. In August she earned $3.45, in September $5.30, in October $2.95, in November $4.60, and in December $7.15. How much did she earn in all?

9. On Saturday Ellen shopped. The meat cost $2.14, the vegetables cost $.85, a cake cost $.72, and flour cost $1.97. How much did she spend?



An Idea for Your Notebook

Save adding machine slips from your grocery orders. Paste them in your notebook. Give the numbers to the class to add. Do the pupils get the same answers?



A Week-End Trip

1. The Smith family drove 78 miles Friday evening, 186 miles Saturday, and 297 miles Sunday. How many miles did they drive in all?

2. Mr. Smith paid $7.70 for a tourist cabin, $5.58 for gasoline, and $16.25 for meals. How much did he pay in all?

3. Mrs. Smith took pictures on the trip. She paid 75¢ for films, 30¢ to have them developed, and $1.25 to have prints made. How much did the pictures cost? (How do you write 75¢ and 30¢?)

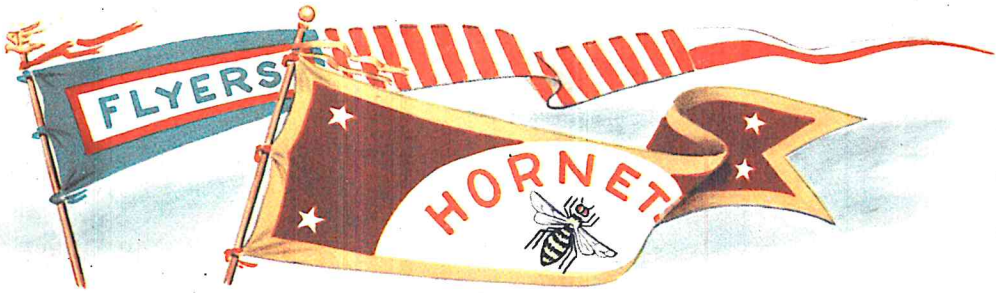
4. Dorothy paid 25¢ for postcards, $1.79 for a lamp, and 98¢ for a book. How much did she spend?

5. Jack traded stamps with a boy at the tourist camp. Jack now has 314 United States stamps, 77 British stamps, 64 French stamps, and 98 Dutch stamps. How many stamps does he have in all?

Getting Better Acquainted with Words

Copy these words in your notebook. Study them carefully. Now close your notebook and see if you can write them correctly.

million	comma	pounds (lb.)	arithmetic
period	addend	miles (mi.)	decimal



Pennant Races in Addition

Divide the class into two teams. After each race write the correct sums on the blackboard. The pennant winner will be the team having the greater number of perfect papers.

Race I. Add each number in Row B to each number in Row A. There are thirty-six answers in all.

Row A	492	478	304	570	816	700
Row B	437	659	300	709	640	859

Will the same team win again?

Race II. Write the sums only. Add down Check by adding up.

375	492	305	540	153	689
418	385	217	978	516	576
304	463	952	135	263	415

Help your team to win!

Race III. Write sums only. Check.

873	498	509	378	369	582
149	390	316	215	832	531
452	148	647	582	178	347
637	473	938	482	796	305

Thinking and Adding in Round Numbers

Instead of trying to remember an exact number, it is often easier to remember the amount in **round numbers.** Instead of giving the exact number, you give the nearest ten, hundred, or thousand.

1. If there are 48 children in your class, would you say, to the nearest ten, that there are about 40 or about 50 children?

2. Give the following amounts in round numbers:

To nearest ten	To nearest hundred	To nearest thousand
98 pencils	405 books	1948 years
52 crayons	$279	7980 pounds

Sometimes people who do not have a pencil handy find a sum in round numbers. The sum is not exact, but it gives an idea, or **estimate,** of what the exact sum will be.

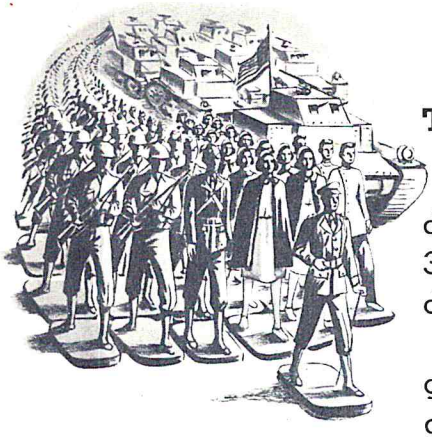
3. A workman wanted to estimate in round numbers how many feet of lumber he had.

Exact Numbers		Round Numbers
3796	He thought 3796 is nearest	4000
5290	5290 is nearest	5000
8293	8293 is nearest	8000
17379	Add 4, 5, and 8 in thousands place, and the sum is 17,000.	17,000

The sum 17,000 is not the exact sum, but it is very near, and so it is a good estimate.

4. Show how the workman would estimate the sums, or add, the following in round numbers:

6923	7235	5134	1104	6913	5300
1102	4921	4887	1995	4295	5189



The Parade of the Toy Soldiers

1. Ruth has 115 lead soldiers, 5 nurses, 7 captains, and 3 doctors. How many lead toys does Ruth have?

2. Billy has 278 soldiers, 1 general, 5 captains, 12 nurses, and 34 tanks. How many lead toys does Billy have?

3. Jerry has a mold for making lead soldiers. He made 15 for Ruth, 29 for Billy, and 12 for himself. How many did he make in all?

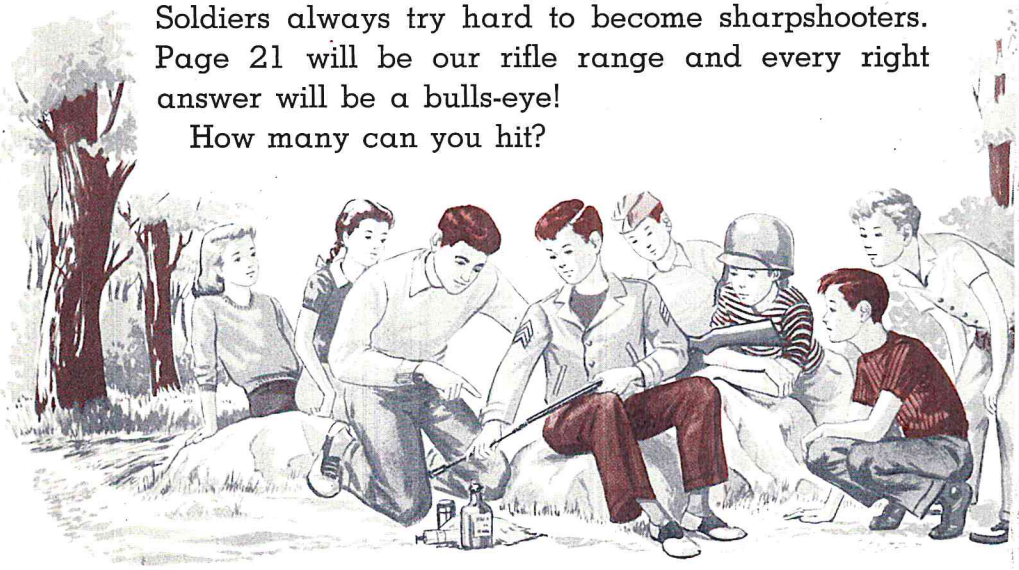
4. Jerry, Ruth, and Billy have a parade of their lead toys. These were in the parade: 376 soldiers, 18 captains, 14 nurses, and 39 tanks. How many toys were in the parade?

Sharpshooters

The work of Unit 1 is about finished. The time has come to find out how well you know this work.

Let's play that we are soldiers at rifle practice. Soldiers always try hard to become sharpshooters. Page 21 will be our rifle range and every right answer will be a bulls-eye!

How many can you hit?



First Call to the Rifle Range

Write in figures and point off into periods:

1. 376 thousand 423 **2.** 16 million 14 thousand

3. Eighteen million nine thousand sixteen

4. 163 million 58 thousand 218

Write these numbers in figures and words:

5. 524,623 **6.** 28,763,491 **7.** 187,001,010

Write the sums:

	a	b	c	d	e
8.	13+6	23+6	33+6	17+6	29+9
9.	17+8	24+8	57+9	35+8	19+6

Copy neatly in straight columns and add:

10. 7, 5, 6, 0, 9 **11.** $1.25, $5.21, $.25

12. 13, 26, 54, 31 **13.** 28¢, 34¢, 68¢, 39¢

Choose a captain. He will write the correct answers on the blackboard. Each soldier will mark his own paper with a red crayon and then pass it to another soldier for inspection.

There are 13 targets on this page. Soldiers who hit 11 or more bulls-eyes are sharpshooters. They will find new targets to shoot at on page 23.

Other soldiers! Forward! March! Go to page 22 for more practice and another chance to make more bulls-eyes.

Second Call to the Rifle Range

Try to hit the bulls-eye 14 times on this page.

Write in figures:

1. One hundred ninety-three million sixty-four

2. Four hundred thirty-seven million ten thousand

Copy carefully and add:

3. \$13.25, \$45.50, \$1.05

4. \$18.73, \$6.40, \$127.18

5. 49¢, 73¢, 92¢, 17¢

6. 81, 16, 7, 45, 90

7. 126, 17, 92, 374

8. 16, 477, 968, 93

9. Six boys and girls played "catch." Here are their scores by games. Find the total score of each.

Dorothy	Harold	Harriet	Peggy	Charles	Edward
14	10	9	15	13	21
0	14	22	4	23	14
9	20	17	23	7	5
13	8	1	0	32	14
8	6	3	11	0	6
7	9	0	19	0	2

Choose a captain to write the correct answers on the blackboard. Mark your paper. Then pass it to someone else for inspection. When you get your paper back, go over the examples that you missed and find where you made a mistake.

All pupils will now do the work on page 24.

Targets for Sharpshooters

Write the sums on folded paper:

1.

264	142	902	415
54	298	32	7
4,381	6	147	38

2.

3,455	98	3	67
462	177	449	508
1,004	47	39	8

3.

$42.34	$1.53	$225.00	$.40	$8.95
1.28	.06	557.41	.65	3.27

4.

$49.85	$ .53	$35.44	$1.04	$.75
4.62	2.18	8.75	.98	.17
18.00	1.13	9.70	.35	.45

5. Father earned $25 last week. Mother spent $11.83 for groceries, 35 cents at the drugstore, $2.15 for laundry, and $12.55 for coal. Did Father earn enough to pay all the bills?

6. I paid $3.95 for a tennis racket, 50¢ for tennis balls, and seventy-five cents for a cover for the racket. How much did I spend?

7. Jack and Jane have a kite. They tie a string 42 feet long to the kite. This is too short. Then they tie on two pieces of string each of which is twice as long as the first piece. How long is the string on the kite then?

Dress Parade—Review of Unit 1

Add. Check by adding in the opposite direction.

1.

34	92	63	84	95	79	57	83
52	7	25	63	84	87	98	27

2.

54	72	86	92	40	35	64	53
30	25	5	76	30	50	16	30
13	41	43	8	20	8	20	17

3.

			790	420	300	328
187	784	638	235	87	240	63
436	962	421	596	619	46	370

4.

8	9	2	5	28	31	38	782
7	2	0	4	43	42	29	563
6	5	4	9	67	56	47	924
3	8	7	6	84	73	68	647
1	4	9	2	20	91	40	983
3	7	3	4	76	70	45	216

Copy neatly in straight columns and add:

5. 3, 6, 5, 8, 3

6. 395, 470, 187

7. 27, 54, 26, 93

8. 284, 96, 537, 14

9. 27, 416, 9, 934

10. 328, 17, 64, 766

11. Joan's mother bought her a dress for $5.85, a pair of shoes for $3.95, a raincoat for $2.98, and a sweater for $2.89. How much did they all cost?

Arabic and Roman Numbers

Dorothy and Jack Smith have been reading about the Arabs and the Romans. You wonder, of course, what that has to do with arithmetic. Well, ever so much, as you will find out.

The Arabs and the Romans each gave us a way to write numbers. The numbers you use every day are Arabic numbers. All these numbers are made from the ten figures:

1 2 3 4 5 6 7 8 9 0

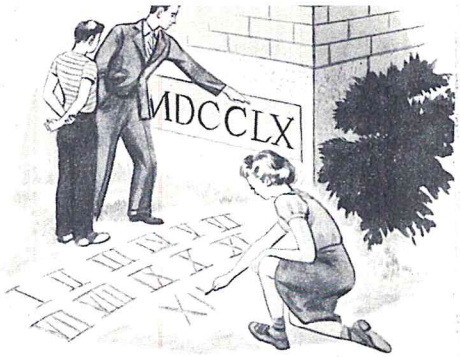
Special Reports for Book Explorers

1. Go to a library and find out some interesting things about the Arabs and the Romans.

2. Try to find some pictures or drawings that show how the Arabs and the Romans lived.

3. The Phoenicians were great traders and brought the Arabic numbers to Europe. Find out all you can about the Phoenicians.

Reading Roman Numerals



While on their trip, Dorothy and Jack saw these numbers. They knew how to read Roman numerals on a clock, but they had not learned to read big Roman numerals. Father explained that the Romans wrote their numbers with only seven letters:

I	V	X	L	C	D	M
1	5	10	50	100	500	1000

Dorothy said, "I can write up to 12 in Roman numerals," and she wrote with a stick in the sand:

I II III IV V VI VII VIII IX X XI XII

"That's easy," said Jack. "That's just what is on a clock."

"Well," said Father, "I see you are ready to learn how the Romans wrote long numbers. There are just two rules to learn."

Rule I

If a letter is repeated, or if a letter is followed by a letter of less value, the number is the sum of the values of the letters.

II is 2. XV is 15. XVII is 17. LX is 60.
VI is 6. XX is 20. XXXIII is 33. DC is 600.

1. What numbers are these?
   III XI XVI CCL XXXVIII MD
2. Write these numbers in Roman numerals:
   36, 22, 18, 150, 1300, 627, 757

Rule II

If there are two different letters and the one with the smaller value is written first, the number is the difference of the values of the letters.

IV is I less than V or 4. 5 less 1 is IV.
IX is I less than X or 9. 10 less 1 is IX.
XL is X less than L or 40. 50 less 10 is XL.

Say the values of these: XC, CD, CM.

Rule I and Rule II Work Together

Explain how Rule I and Rule II work together in these numbers:

XIV is 14. XXIX is 29. MCMXLV is 1945.

Think of Rules I and II separately or working together. Read these numbers:

1. XXV	**6.** CCII	**11.** MCDXCII
2. XLIII	**7.** LV	**12.** MDCCCXLIV
3. XIX	**8.** CDLVI	**13.** MCMXXXIX
4. LXVIII	**9.** MDCCC	**14.** MCMXIV
5. XCIX	**10.** CDXXXIV	**15.** DCCXCVIII

16. "Now that you know the rules," Father said, "try writing these numbers in Roman numerals: I am 71 inches tall, weigh 185 pounds, and was born in 1912."

Dorothy wrote: LXXI, CLXXXV, and MCMXII. Was she right?

17. Make up a sentence about your height, weight, and year of birth, and write the numbers in Roman numerals.

Roman Numerals in Many Places

1. The last chapter in Dorothy's book is XVIII. How many chapters are in the book?

2. Mrs. Smith has a bill in her purse with XX printed on it. What is the value of the bill?

3. The building of the Capitol in Washington was begun in MDCCXCIII. What year was that?

4. Washington's monument was begun in 1848. Write this date in Roman numerals.

5. A movie had on it, "Produced in MCMXLV." In what year was the movie made?

6. A certain book has MCMXXVII on the first page. In what year was the book written?

7. What year is this? Write the year in Roman numerals.

8. There are 78 chapters in a large book that Ruth and Frank are reading. Write 78 in Roman numerals.

9. Last week Ruth read 10 chapters beginning with chapter 47. Write in Roman numerals the numbers of all the chapters she read last week.

10. A printer said he would print 8,000 cards at $3 per M. What did he mean?

11. Which of these numbers is the larger:

MCDXCII or MDCCXII?

For Your Notebook

Make a copy of all the Roman numerals you can find. Tell where each is used.

The 100 Simple Subtraction Facts

Use folded paper. Subtract:

1.	0	5	7	3	3	6	4	8	1	5
	0	1	7	2	3	6	2	1	1	4
2.	5	9	9	4	9	6	8	5	4	7
	3	9	1	4	8	5	4	5	3	1
3.	3	6	5	2	6	6	7	2	4	8
	1	3	2	1	1	4	5	2	1	7
4.	9	7	10	6	10	11	8	10	12	7
	5	6	2	2	1	2	6	7	6	2
5.	9	6	7	9	8	10	8	9	5	3
	0	0	3	3	8	4	2	6	0	0
6.	4	9	9	2	8	10	10	12	7	8
	0	4	7	0	0	6	5	9	0	3
7.	1	12	7	10	12	14	10	10	9	11
	0	8	4	8	4	7	9	3	2	8
8.	11	8	15	13	11	11	18	16	11	11
	5	5	8	6	7	9	9	8	6	4
9.	12	12	14	15	12	11	13	14	13	16
	7	5	8	6	3	3	8	6	7	7
10.	13	13	15	17	15	17	14	16	13	14
	5	9	7	8	9	9	5	9	4	9

Have the answers put on the blackboard.

Is Someone Blocking Your Row?

You are players in a game. It takes teamwork to make your row win. Choose two who subtract well as coaches for each row.

A Formation that Wins

Subtract. Write answers on folded paper.

1.	10 − 2	10 − 1	10 − 3	10 − 6	10 − 7	10 − 5	10 − 9	10 − 8	10 − 4
2.	11 − 5	11 − 3	11 − 7	11 − 4	11 − 2	11 − 6	11 − 9	11 − 8	
3.	12 − 3	12 − 7	12 − 4	12 − 6	12 − 8	12 − 5	12 − 9		
4.	13 − 8	13 − 6	13 − 5	13 − 4	13 − 7	13 − 9			
5.	14 − 6	14 − 5	14 − 7	14 − 8	14 − 9				
6.	15 − 9	15 − 7	15 − 8	15 − 6					
7.	16 − 8	16 − 9	16 − 7						
8.	17 − 8	17 − 9							
9.	18 − 9								

Remembering What You Learned About Subtraction

To find the difference between two numbers, we use subtraction.

In a subtraction example, the larger number is the **minuend.** The smaller number which you subtract from the minuend is the **subtrahend.** The answer is the **difference** or **remainder**

$486 minuend
251 subtrahend
$235 difference

To prove or check subtraction, add the difference to the subtrahend. If the sum is the same as the minuend, the subtraction is correct.

1. Subtract 216 from 853. Check.

Subtract:

853 minuend
216 subtrahend
637 difference

Check:

216 (subtrahend)
637 (difference)
853 (minuend)

To subtract, think 6 from 13 is 7. Why 13? Write 7 under 6.

Think 1 from 4 is 3. Why 4? Write **3** under 1.

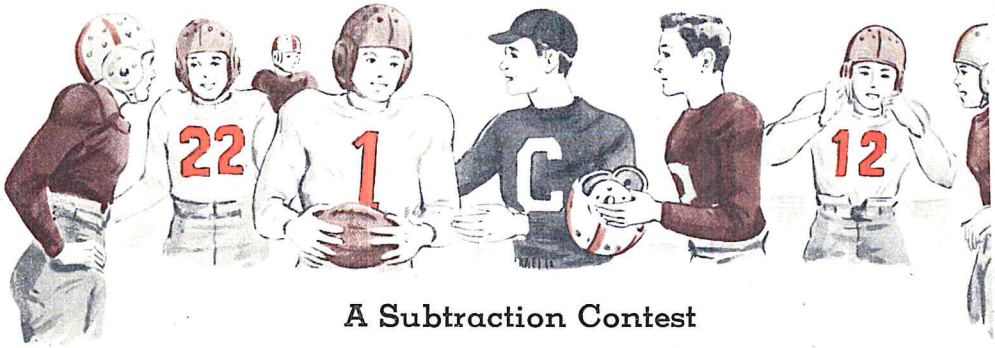
Think 2 from 8 is 6. Write **6** under 2.

The difference is **637**. Explain how to check this answer.

Subtract and check:

2.

857	946	312	594	364	279
643	215	191	475	155	137



A Subtraction Contest

Each row will choose someone who subtracts well for captain. The captain will see that all in his row work hard and do their work neatly.

Subtract. Write the answers on folded paper.

1.	36	97	76	85	91	48	59	70
	21	83	32	42	31	30	19	40
2.	43	55	74	93	80	72	85	50
	27	36	38	54	39	46	58	26
3.	34	45	23	31	33	25	24	37
	8	6	7	3	26	18	16	28

4.	186	165	154	137	172	119
	53	43	31	92	81	79
5.	193	185	173	127	144	135
	48	76	45	39	54	88
6.	504	706	307	903	506	305
	2	4	8	1	4	7

Have someone write the answers on the blackboard. Which row had the largest number of correct papers?

Will You Get the Right Change?
No Pencils, Please!

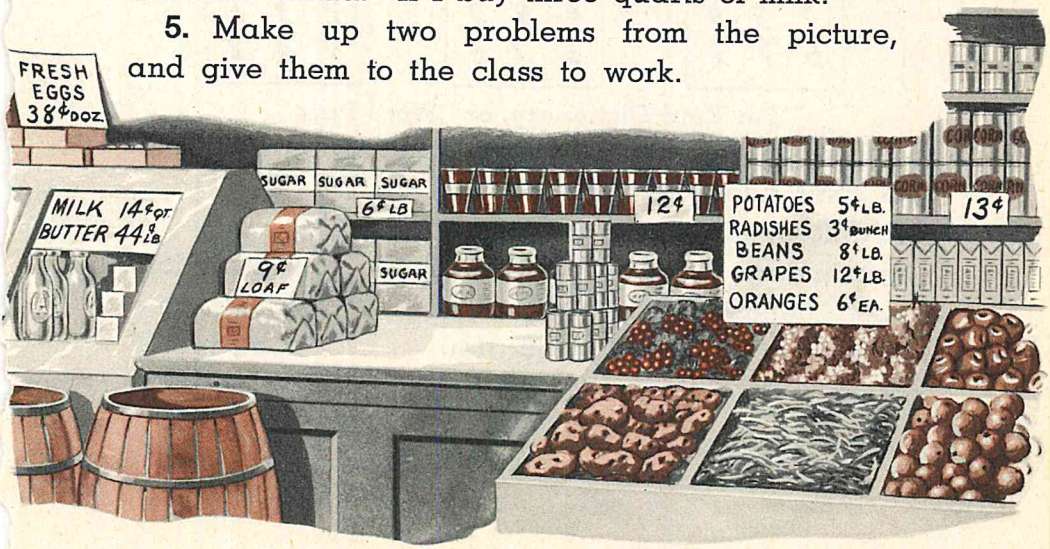
1. If you went to this store with 21¢ in your purse, how much would you have left if you bought an orange? If you bought a quart of milk?

2. Your mother gave you two dimes. Have you enough to pay for an orange and a pound of grapes? Have you enough to pay for a loaf of bread and a glass of jelly? Have you enough to pay for a dozen eggs? Have you enough to pay for a pound of butter?

3. I gave the storekeeper a quarter. How much change will he give me if I buy three pounds of sugar? If I buy a pound of grapes and a pound of beans? If I buy a can of corn and a bunch of radishes?

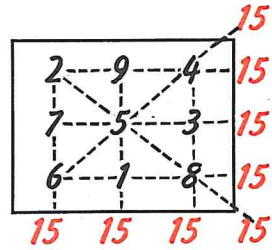
4. I gave the storekeeper a half dollar. How much change will I get if I buy a pound of butter? If I buy a dozen eggs? If I buy a dozen eggs and a loaf of bread? If I buy three quarts of milk?

5. Make up two problems from the picture, and give them to the class to work.



Magic Squares

Try the Subtraction Contest on page 32 again. If you still find the contest hard, have someone help you on pages 29 and 30.



When you become quick at subtracting and make no mistakes, then try playing the game of magic squares. Magic squares came from China. Really, they are much like crossword puzzles. Their magic is this: Every way you add you get the same sum. The dotted lines and the numbers outside the squares show what this means.

Test These Squares. Are They Magic?

6	7	2
1	5	9
8	3	4

4	3	8
9	5	1
2	7	6

8	2	5
4	7	1
3	6	9

8	3	4
1	5	9
6	7	2

3	5	7
4	9	2
8	1	6

6	8	1
2	3	5
9	4	2

For Your Dictionary, or "Word Page"

Copy these words in your notebook. Be able to spell and pronounce them.

Arabic numbers	Roman numerals	
remainder	minuend	subtraction
subtrahend	change	difference
problem	quarter	subtract

Some Everyday Uses of Subtraction

When you subtract dollars and cents, *write the numbers so that one decimal point is exactly under the other decimal point.* Write the figures carefully and in straight columns. Remember to write the dollar sign in front of the answer, and to write the decimal point separating the dollars from the cents.

Copy and subtract:

1. \$7.35 from \$9.27

2. \$.92 from \$3.25

3. \$8.45 from \$15.32

4. \$.78 from \$22.16

5. Harry wishes to have saved \$30.00 by Christmas. He has already saved \$15.65. How much more must he save?

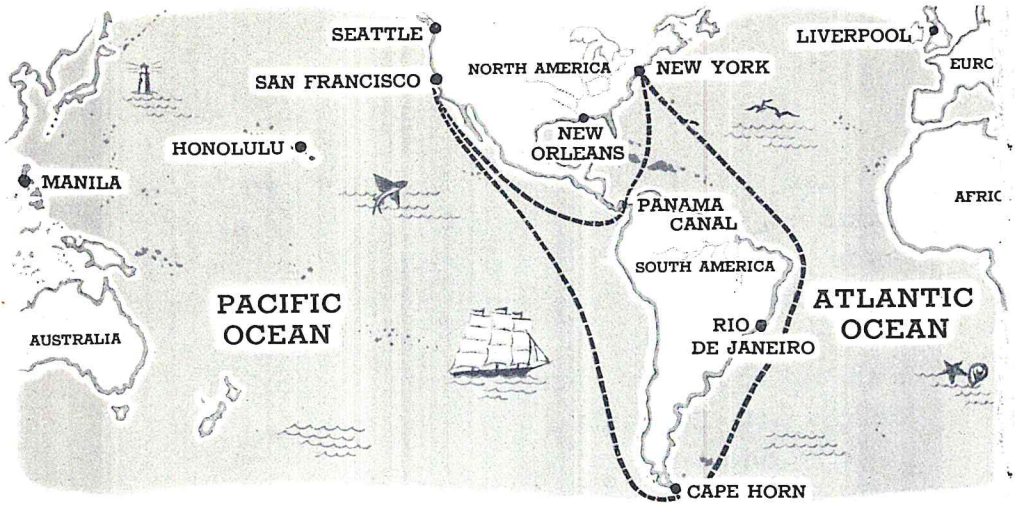
6. Last year Harry saved \$25 for Christmas and spent \$18.22. How much did he have left?

7. The minuends in the subtractions below give the total amount of goods bought. The subtrahends give the amounts paid. You are to find how much is still owed.

Meats	Gas	Groceries	Drugs	Rent
\$5.52	\$7.14	\$8.75	\$3.30	\$17.00
1.32	2.53	2.80	1.45	8.00

Ice	Newspaper	Coal	Electricity	Laundry
\$1.98	\$1.35	\$4.79	\$3.44	\$7.35
.45	.70	3.85	.98	6.75

8. Mr. Dale raised 2,426 chickens last year. How many did he have left after he had sold 1,872?



Our Panama Canal

The Panama Canal was opened for use in 1914. Before that time ships in going from the Atlantic to the Pacific or from the Pacific to the Atlantic had to go around South America.

1. It is 6,059 miles from San Francisco to New York by way of the Panama Canal. It is 15,348 miles around the southern end of South America. How many miles are saved by going through the Panama Canal?

If you go between these cities, how many miles are saved by going through the Panama Canal?

	From	To	Miles Around S. A.	Miles Through P. C.
2.	Honolulu	New Orleans	15,942	7,051
3.	Seattle	Liverpool	16,806	10,014
4.	Rio de Janeiro	San Francisco	8,339	7,678
5.	New York	Manila	19,530	11,585
6.	New Orleans	San Francisco	13,644	4,698

Using Round Numbers in Subtraction

1. If the distance from San Francisco to New York through the Panama Canal is 6,059 miles, what is the distance in round numbers to the nearest thousand?

2. Read in round numbers to the nearest thousand each of the distances given on page 36.

3. Estimate in round numbers to the nearest thousand the number of miles saved by going through the Panama Canal from San Francisco to New York.

Think 15,348 is about. . . . . Work 15,000

6,059 is about. 6,000

The number of miles saved is about 9,000

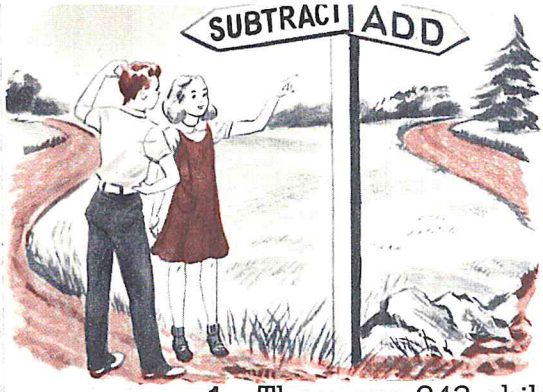
4. Estimate in round numbers to the nearest thousand the number of miles saved by using the Panama Canal on trips between the cities given in examples 2 through 6 on page 36.

5. There are 875 books in our school library. If 235 of these books are taken out by the children, how many are left in the library?

6. Estimate the number of books left in the library in problem 5 to the nearest hundred.

7. We have 89 books in our room library. If 27 books are left in the room, how many books have the children taken out?

8. Estimate the number of books taken out in problem 7, using round numbers to the nearest ten.



Which Way?

Read the problem carefully. Decide whether you should add or subtract to find the answer. Then work the problem.

1. There are 243 children in the primary grades of the Bates School; there are 321 children in the middle grades and 309 in the upper grades. How many children go to the Bates School?

2. Jane thinks she should weigh 84 pounds. She weighs only 79 pounds. How many pounds does she think she should gain?

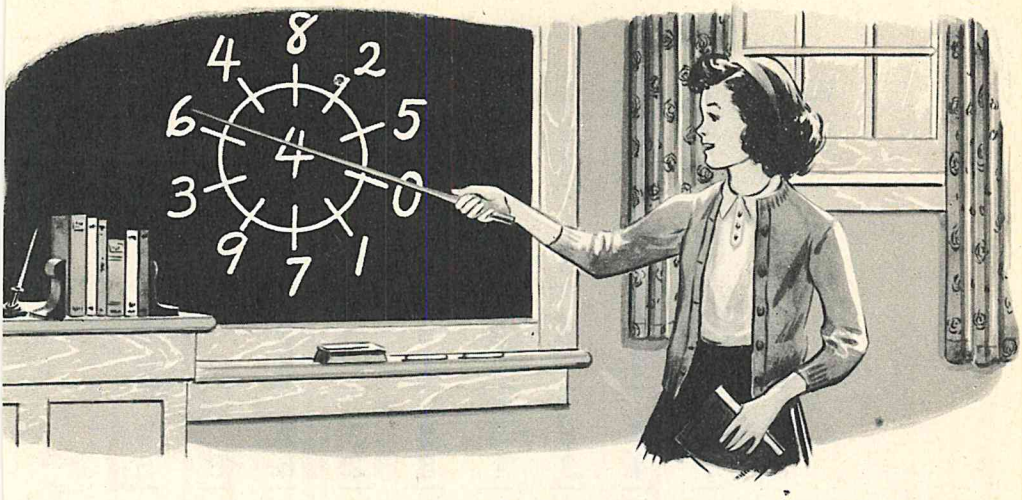
3. Ted earned 25¢ helping Mrs. Smith and 35¢ helping his father. How much did he earn?

4. Henry has saved $1.65. How much more does he need to buy a football costing $2.25?

5. Melvin bought a pair of roller skates that cost $1.69. He gave the clerk $5. How much change should Melvin get?

6. A ewe is a mother sheep. A lamb is a baby sheep. Robert's uncle asked him to count the sheep in 6 pens. Robert counted 7 ewes and 10 lambs in one pen, 6 ewes and 9 lambs in another, 5 ewes and 5 lambs in another, 5 ewes and 8 lambs in another, 8 ewes and 11 lambs in another, and 6 ewes and 7 lambs in the last.

How many ewes were there? How many lambs? How many more lambs than ewes?



How Well Can You Multiply?

Mary is showing the class an interesting way to review the multiplication facts. Multiply the number in the ring in turn by each number around the ring. Begin wherever Mary points. Say "Six 4's are 24" or "6 times 4 are 24," and so on.

When the 4 in the ring gets too easy, change it to another one-figure number. Practice these.

	a	b	c	d
1.	4 5's are ?	6 × 7 are ?	3 × ? are 27	63 is 7 × ?
2.	4 9's are ?	8 × 9 are ?	4 × ? are 36	56 is 8 × ?
3.	5 7's are ?	3 × 8 are ?	7 × ? are 42	72 is 9 × ?
4.	6 8's are ?	7 × 6 are ?	6 × ? are 24	54 is 6 × ?

For Your Notebook for Tomorrow

Write 10 examples like those above.

Copy the 10 examples on the blackboard for the class to answer.

The 100 Multiplication Facts

Write the products on folded paper:

1.	6	4	8	9	5	9	7	1	5	8
	2	1	8	7	9	6	3	5	4	0
2.	9	4	7	8	4	3	1	8	4	7
	3	6	1	5	8	9	7	9	3	2
3.	9	8	4	6	3	8	6	2	7	8
	4	6	7	9	4	1	4	5	7	3
4.	3	2	8	6	3	5	3	2	7	4
	8	7	4	3	1	5	2	6	9	5
5.	0	6	6	1	2	4	2	9	3	5
	6	8	1	3	2	5	4	9	7	6
6.	9	3	9	8	4	7	0	1	3	7
	8	3	0	7	0	0	4	2	6	9
7.	7	6	8	1	0	7	9	1	6	5
	8	5	2	0	7	6	5	9	6	2
8.	6	4	0	3	0	2	5	9	5	2
	7	4	2	0	0	1	3	2	8	9
9.	1	3	2	9	1	7	5	5	1	1
	8	5	8	1	6	4	1	7	4	1
10.	0	0	2	6	0	0	2	0	5	4
	9	5	3	0	1	8	0	3	0	2

Try to know the 100 multiplication facts so well that you can write the products in 3 minutes.

Merry-Go-Rounds Are Fine for Practice

Helper cards do not get lost if they are made into merry - go - rounds. Merry - go - rounds make helper cards easier to use, too.

Betty and George cut heavy paper into cards 3 inches wide and 4 inches long. On the front of each card they wrote a hard multiplication fact in heavy black crayon without the product. On the back they wrote the same multiplication fact with the product. They punched a hole in each card near the top and put all the cards on a notebook ring. When they had finished, they had a multiplication merry-go-round.

Make a merry-go-round of these multiplication facts:

5	9	5	9	6	9	8	5	8	7
×8	×5	×7	×6	×7	×8	×7	×9	×4	×7
4	9	4	7	8	3	9	7	8	7
×8	×9	×7	×9	×6	×9	×7	×5	×9	×6
7	8	6	6	8	5	9	7	4	5
×4	×5	×9	×6	×8	×6	×4	×8	×9	×5

Times-And Facts Around the Star

Study these "times-and" facts until you can say them quickly with the answers covered:

4 **times** 5 **and** 1 are 21.	$5\times7+4=39$
6 **times** 3 **and** 5 are 23.	$3\times8+1=25$
9 **times** 6 **and** 4 are 58.	$8\times6+5=53$

Whenever you carry in multiplication, you have to use a times-and fact.

1. Multiply 769 by 8.

Think 8 times 9 are 72. Write **2** and carry 7.

Think 8 **times** 6 **and** 7 are 55. Write **5** and carry 5.

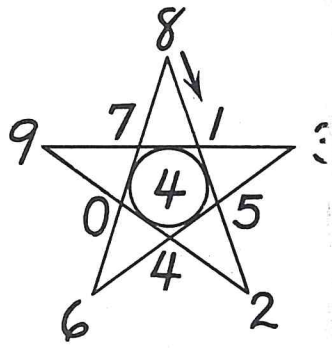
Think 8 **times** 7 **and** 5 are 61. Write **61**.

$$\begin{array}{r} 769 \\ \times\ 8 \\ \hline 6{,}152 \end{array}$$

2. Find the products. Think of the times-and facts as you multiply.

769	376	857	885	246	745
$\times 6$	$\times 4$	$\times 7$	$\times 3$	$\times 9$	$\times 5$

3. Think of two numbers, as 4 and 2. Multiply each number around the star by 4 and add 2. Say the answers quickly. Begin, "4 **times** 8 **and** 2 are 34, 4 **times** 1 **and** 2 are 6, . . . "



Play the game of "Times-And Around the Star" with the numbers given below.

4. 4 times ? and 3

5. 6 times ? and 5

6. 7 times ? and 6

7. 9 times ? and 4

Pennant Races in Multiplication

Divide the class into two teams. After each race write the correct products on the blackboard.

Race I. Multiply each number in Row A by each number in Row B. You will have 64 products.

Row A	23	64	58	97	53	49	67	82
Row B	2	3	4	5	6	7	8	9

Race II. Copy and write the products:

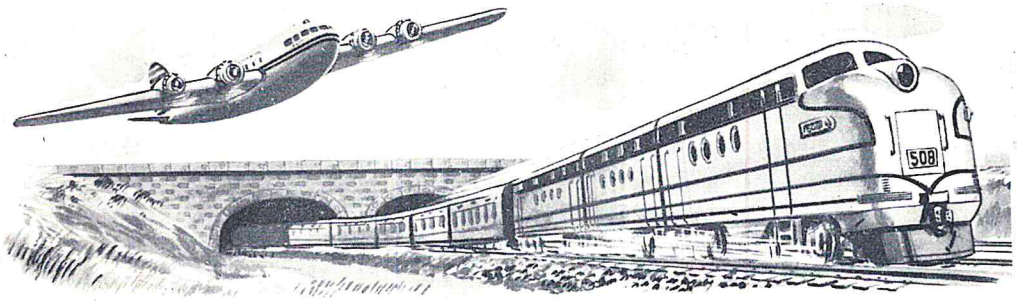
1. 432 × 3 = ___ 312 × 4 = ___ 211 × 6 = ___ 634 × 2 = ___ 512 × 3 = ___ 121 × 4 = ___ 424 × 2 = ___
2. 641 × 5 = ___ 372 × 7 = ___ 483 × 9 = ___ 627 × 8 = ___ 413 × 6 = ___ 687 × 4 = ___ 598 × 8 = ___

Race III. Copy and write the products:

1. 30 × 2 = ___ 50 × 3 = ___ 70 × 8 = ___ 40 × 4 = ___ 60 × 6 = ___ 80 × 9 = ___ 90 × 7 = ___ 20 × 5 = ___
2. 230 × 5 = ___ 420 × 8 = ___ 710 × 7 = ___ 402 × 4 = ___ 609 × 3 = ___ 705 × 6 = ___ 840 × 9 = ___

Race IV. Copy and write the products:

1,783 × 6 = ___ 98,157 × 9 = ___ 76,342 × 7 = ___ 64,828 × 6 = ___ 8,690 × 5 = ___



Planes and Trains

1. A certain train travels an average of 78 miles an hour. How far does it travel in 24 hours?

Study the multiplication below, and learn the names of the numbers.

Multiplication Example	Names of Numbers
78 miles	78 multiplicand
24	24 multiplier
312	312 first partial product
156	156 second partial product
1872 miles	1872 product

2. A certain passenger plane averages 163 miles an hour. How far can it travel in 24 hours?

3. How far does the train go in 12 hours? How far does the airplane go in 12 hours? How much farther does the plane go than the train?

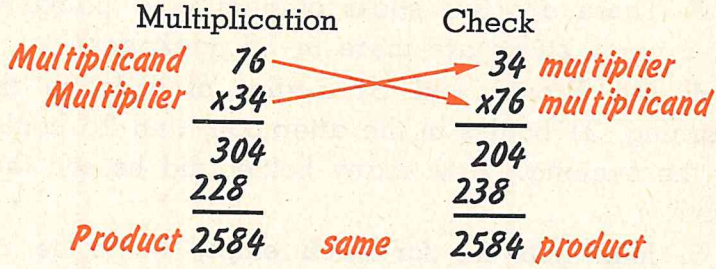
4. How far can the train go in 18 hours? In 26 hours?

5. How far can the plane go in 15 hours? In 23 hours?

6. The plane carries an average of 32 persons each trip. How many will it carry in 9 trips?

Learning to Check Your Multiplication

Checking helps you to know if you have the right answer. *A good way to check multiplication is to change the places of the multiplicand and the multiplier and to multiply again.*



Multiply and check:

	a	b	c	d	e	f	g	h	i
1.	35	36	63	46	82	59	83	34	73
	41	23	57	58	49	68	28	48	23
2.	82	48	96	54	69	24	93	84	38
	63	92	47	66	42	82	64	23	64
3.	64	18	24	13	25	65	56	39	45
	21	23	36	38	39	86	97	64	82
4.	58	91	38	63	86	83	76	43	19
	26	89	54	39	48	78	88	32	48
5.	79	91	46	58	85	77	87	84	83
	43	27	25	54	35	22	26	29	36

Will You Add, Subtract, or Multiply?

1. If there are six doughnuts in a package, how many will there be in three packages?

2. The bakery truck brought 35 packages of doughnuts to Mr. Brown's store. How many doughnuts was that?

3. There are five sticks of gum in a package. How many sticks are there in 18 packages?

4. Mr. Brown sold 37 bottles of soda in the morning, 21 bottles in the afternoon, and 25 bottles in the evening. How many bottles did he sell that day?

5. John gets 2¢ for each empty bottle he returns to Mr. Brown. How much will he get if he returns 9 empty bottles?

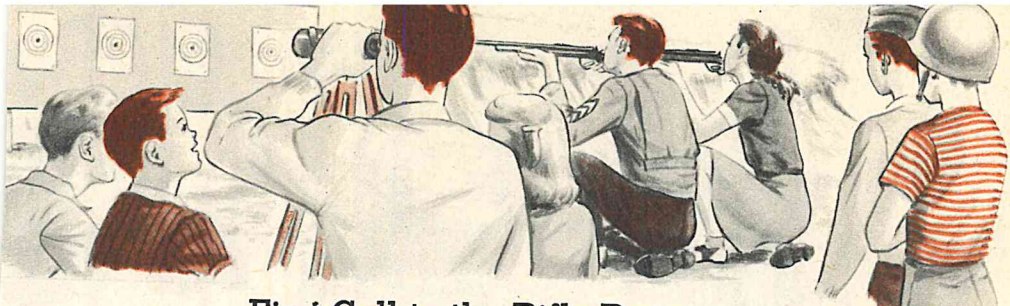
6. Mr. Brown put 45 bottles of soda on ice. How many bottles did he have left on ice after he sold 12 bottles?

7. John bought 4 sacks of candy with 8 pieces in each sack. How many pieces did he buy?

8. Mr. Brown had 24 lb. of broken milk chocolate candy. During the week he sold 19 lb. of it. How many pounds did he have left?

9. He had 9 bags of potato chips. The truck brought 36 bags. How many bags of potato chips did he then have in the store?

10. He had 24 chocolate bars in the case and 96 bars in a box on the shelf. How many bars did he have in all?



First Call to the Rifle Range

You hit a bulls-eye with each right answer.

1. Write these Roman numerals in Arabic numbers:

XL CXXII MD MDCCC MDCCCXLII MCM

2. Write these Arabic numbers as Roman numerals:

125 1,000 1,776 1,914 617 426

Copy and subtract:

3.

47	94	95	34	74	80	76	87
39	15	75	19	29	31	43	50

4.

310	867	891	320	500	800	569
27	249	104	199	80	723	296

5.

$8.72	$6.34	$8.33	$50.00	$15.85
1.85	4.79	4.04	1.34	11.04

6.

$6.00	$5.05	$7.93	$54.32	$10.01
.17	1.14	4.12	19.99	1.10

You had 37 shots on this page. If you hit as many as 32 bulls-eyes, you are a sharpshooter. Your new targets are on page 49. The rest of you have another chance on page 48.

Second Call to the Rifle Range

Halt! If you made mistakes with Roman numerals on page 47, review pages 25, 26, 27, and 28. If you made mistakes in subtraction, review pages 29, 30, 31, 32, and 35. After you have done this review, you may shoot at the targets below.

1. Write as Roman numerals:

1620 1900 41 39 390 76 24 1400

2. Write in Arabic numbers:

IX XLVI LXXIV DCCCX MDCCL CXCI

Copy and subtract:

3.

$0.85	$0.51	$0.40	$1.25	$1.00	$140.00
.04	.39	.16	1.13	.71	.07

4.

685	794	1,002	950	781	473	999
59	37	309	18	435	231	609

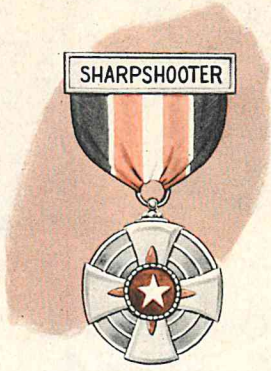
5. Copy and multiply:

89	46	38	42	96	54	29	89	68
21	93	84	67	45	83	65	92	75

Mark papers as on page 21. You had 36 shots on this page. If you hit as many as 32 bulls-eyes, you are a sharpshooter.

All pupils will now work on page 50.

Special Targets for Sharpshooters



How much does your mother save when she buys:

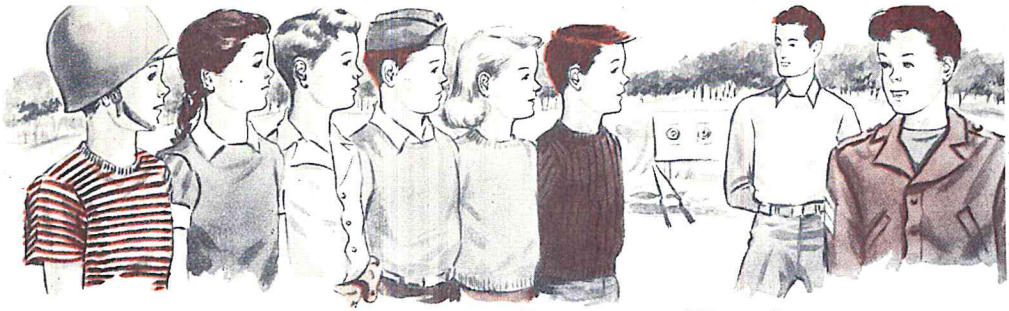
1. a $15 coat for $13.49?
2. a $12.95 radio for $8?
3. a $7 book for $4.97?
4. a $10 hat for $4.98?
5. a $19.95 rug for $18.75?
6. a $100 stove for $59?

7. The left column below names five states giving their areas in square miles. The right column names five countries of South America giving their areas in square miles. Find the difference in area between the state and the country opposite it.

California	158,693	Paraguay	174,854
Maine	33,215	Costa Rica	23,000
Nebraska	77,237	Uruguay	72,153
New York	49,576	Honduras	44,275
Texas	267,339	Ecuador	275,936

8. Find the difference in populations between the states named on the left below and the countries named on the right.

Georgia	3,123,723	Ecuador	3,200,000
Indiana	3,427,796	Bolivia	3,426,296
Michigan	5,256,106	Chile	5,000,782
New York	13,479,142	Mexico	19,478,791



Dress Parade—Review of Unit 2

Copy and add:

1.	275 and 6	178 and 142	1,008 and 18
2.	37 and 1,043	534 and 12	51 and 543

Copy and subtract:

3.	\$5.45 − 65¢	\$1 − 67¢	\$41 − \$4
4.	\$25.33 − \$2	\$4 − \$.45	\$50.05 − \$10

How much do I save when I buy a

5. \$15 suit for \$12.95?

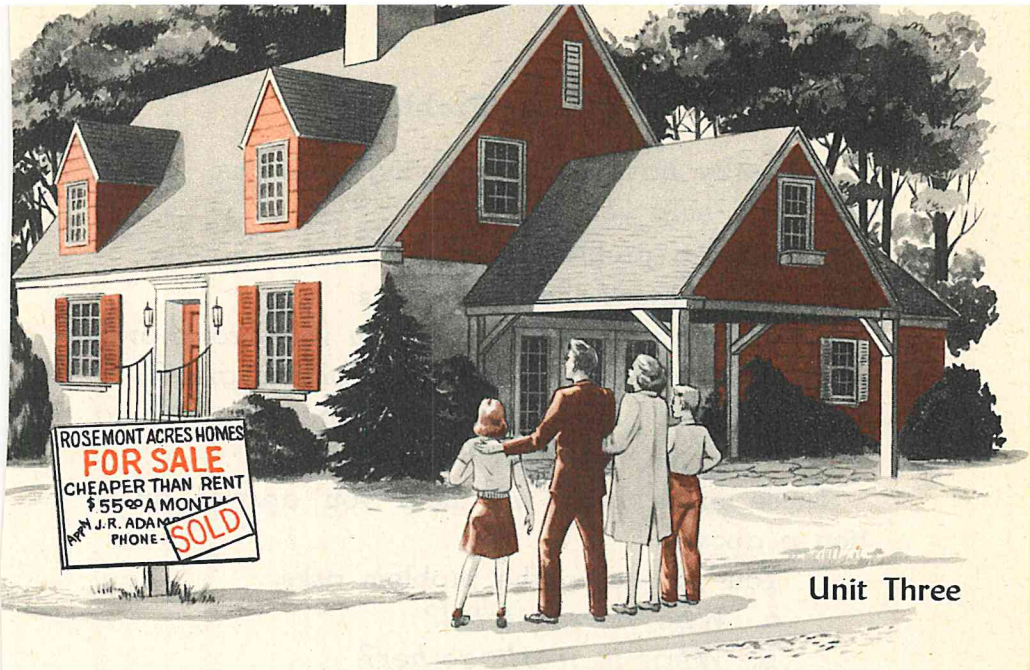
6. \$135 washing machine on sale at \$95?

7. \$4,500 house offered at \$3,950?

8. set of books worth \$100 for \$89.50?

Copy and multiply:

9.	11	15	13	17	12	14	16	15
	5	8	7	9	8	9	7	6
10.	47	76	65	98	59	35	78	67
	32	53	24	72	26	22	35	45
11.	87	78	59	67	83	43	31	71
	81	72	54	64	78	36	28	64
12.	78	63	35	54	91	83	42	23
	59	45	28	37	54	66	17	48



A Brand New House for Tom and Ruth

1. Father bought a new house. He said it cost seven thousand five hundred dollars. Write this amount in figures.

2. Father paid $1500 down on the house. How much is there left to pay?

3. Father must pay $55 a month for 15 years in order to make all the payments on the house. How much will he pay in 12 months, or 1 year? What will he pay in 15 years?

4. Father will have to pay $15 a year for insurance on the house, $145 for taxes, $6 for a water license and $24 for keeping the lawn cut. What will be the total amount of these expenses?

Moving Problems

You may have trouble solving problems. These hints will help you.

1. Read a problem carefully.
2. Ask yourself these questions:
   a. *What does the problem want to know?*
   b. *What facts does the problem give?*
   c. *What must I do with the numbers to get the right answer?*

These extra hints will help you answer question *c* above.

1. You add when the problem asks:
   a. *What is the total?*
   b. *What is it altogether?*
2. You subtract when the problem asks:
   a. *How much is left? How many are left?*
   b. *How much greater? How much less? What is the difference?*
   c. *How much more is needed? How many more are needed?*

Use what you have just learned to solve these problems:

1. The Giant Moving Company charges $16 a load for moving. The Careful Company charges $14 a load. How much less does Mother pay if she hires the Careful Company?

2. The new house is 13 miles from the old one. If Tom rides 10 miles and walks the rest of the way, how many miles are left for him to walk?

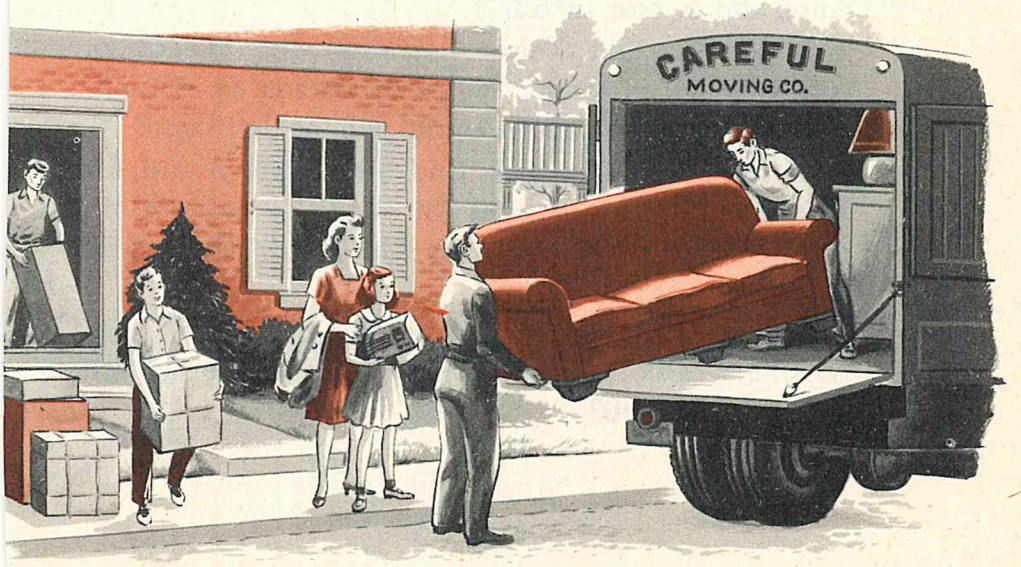
3. Ruth helped her mother 4 hours Monday, 6 hours Tuesday, and 10 hours the day they moved. How many hours did Ruth help in all?

4. Mother needed packing boxes. Tom got 8 from the grocer, 12 from the druggist, and 5 from a neighbor. Mother already had 8 boxes. What was the total number of packing boxes?

5. Mother sold some old furniture. She got $3 for a table, 75 cents for a chair, and $7.50 for a stove. She gave the money to Ruth and Tom for helping her. How much did she give them?

6. There are 23 windows in the new house. Mother has put curtains at 17 windows. How many has she left to do?

7. Mother bought some new furniture for Ruth. The new bed cost $25, the dressing table $8.75, the rug $24.98, the chair $9.95, and the cedar chest $29.75. What was the total cost?



Tom Had Problems Also

Read again the hints on problem solving on page 52.

1. The wallpaper in Tom's room is blue. There are silver stars in the ceiling paper. Tom said, "This makes me think I'm a sailor at sea." Then Mother bought him a sailor's chest for $9.50, a bunk bed for $19.50, a green rug with a big blue anchor on it for $29.75, and a deck chair for $12.85. What was the total cost of the furniture?

2. Tom asked for a typewriter. Mother said, "You'll have to buy that for yourself, Tom." The typewriter cost $6 a month for 11 months. How much did it cost in all?

3. Mother tied Tom's curtains with pieces of cord 14 inches long. Will 120 inches be enough to make 8 cords? How much will be left over?

4. Ruth made a blue and white bedspread for Tom's room. She bought 12 yards of material in all. If 8 yards of this was blue, how much was white?

5. Tom sold his old train set for $10.50 and bought a table. If the table cost $8.75, how much did he have left?

Try This New Step in Multiplication

Multiply 268 by 57. Check.

Multiplication

$$\begin{array}{r} 268 \\ \times 57 \\ \hline 1876 \\ 1340 \\ \hline 15276 \end{array}$$

Check

$$\begin{array}{r} 57 \\ \times 268 \\ \hline 456 \\ 342 \\ 114 \\ \hline 15276 \end{array}$$

Find a good partner. Have him multiply the examples below while you do the checking. After each row change places with your partner.

	a	b	c	d	e	f	g	h
1.	584	467	684	674	387	785	768	346
	42	23	56	97	86	67	98	35
2.	528	658	712	753	587	389	329	789
	24	46	27	73	88	72	59	89
3.	886	958	462	783	463	786	675	398
	74	37	89	47	78	83	29	78
4.	398	597	398	276	467	366	872	384
	37	48	35	29	83	87	38	27

Work for the Notebook

Make up 10 multiplication examples like these you have been working on this page. Find the products and check. See if the rest of the class can multiply your examples correctly.

Using Three-Figure Multipliers

Multiply 764 by 396. Check.

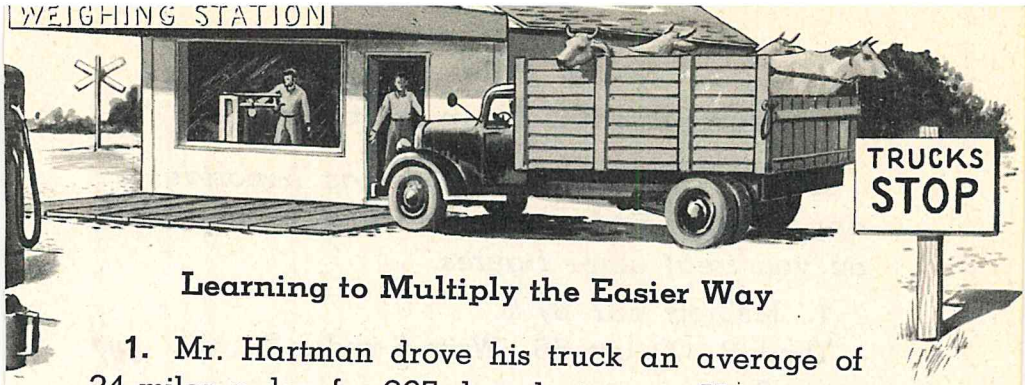
Multiplication	Check
764	396
396	764
4584	1584
6876	2376
2292	2772
302544	302544

Multiply and check. Work with a partner.

	a	b	c	d	e	f
1.	832	942	324	479	269	774
	457	379	243	376	385	793
2.	897	778	869	387	272	867
	874	679	527	698	824	479
3.	284	728	644	482	636	484
	525	163	546	245	481	462
4.	414	598	517	243	383	488
	692	473	866	315	647	535

5. Mr. Day is a train conductor. Last year he made the trip between St. Louis and Cincinnati 323 times. The two cities are 339 miles apart. How many miles did Mr. Day travel in all?

6. A clerk worked 289 days last year, and sold an average of $136 worth of dresses each day. What were her total sales for the year?



Learning to Multiply the Easier Way

1. Mr. Hartman drove his truck an average of 24 miles a day for 365 days last year. How many miles did he drive in all?

One Way	Easier Way
24 miles	365
x365	x24
120	1460
144	730
72	8760 miles
8760 miles	

Why is the second way easier? Always multiply the easier way. The meaning of the problem will tell you how to name your answer.

Solve these problems. Multiply the easier way.

2. Mr. Hartman sold 36 cattle whose average weight was 541 pounds. Find the total weight.

3. He took 146 cases of eggs to town. If each case weighed 47 pounds, how many pounds did the truck carry?

4. Mr. Hartman hauled 52 truck loads of corn to the mill. The average weight of a load was 3,318 pounds. How many pounds did he haul?

Don't Slight Zeros in Multiplication

A zero in a number is just as important as any other figure, and you must treat a zero as you treat other figures.

1. Multiply 607 by 8.

Think 8 7's are 56. Write **6** under 8 and carry 5.

Think 8 0's and 5 are 5. Write **5**.

Think 8 6's are 48. Write **48**.

The answer is **4,856**.

607
x8
4856

2. Multiply 594 by 730.

Think 0 times 594 is 0. Write **0** under 0.

Multiply 594 by 3 and write the product **1782** so that the 2 is under the 3.

Multiply 594 by 7 and write the product **4158** so that the 8 is under the 7.

The answer is **433,620**.

594
730
17820
4158
433620

Multiply. Go over your work to check.

	a	b	c	d	e	f
3.	907 × 7	503 × 8	409 × 6	3205 × 4	2083 × 8	7008 × 9
4.	408 × 42	604 × 38	705 × 64	4306 × 73	1098 × 81	5044 × 96
5.	357 × 230	625 × 120	761 × 460	4745 × 450	3842 × 630	4951 × 480
6.	703 × 320	504 × 260	809 × 740	4106 × 820	8067 × 590	5001 × 660

Multiplying the Long Way with Zeros

Some pupils have trouble with zero. The long way below may help you to understand the short way. It is better and shorter to use the short way.

1. Multiply 324 by 760. Check.

Long Way	Short Way	Check
324	324	760
760	760	324
000	19440	3040
1944	2268	1520
2268	246240	2280
246240		246240

Compare the long way and the short way. How are they alike? How are they different?

Multiply and check:

	a	b	c	d	e	f	g
2.	316	424	943	837	575	629	436
	640	390	720	250	610	890	540
3.	743	856	928	775	549	691	749
	410	750	430	690	240	130	270

4. Find the weight of 320 packing boxes, each weighing 128 pounds.

5. Find the weight of 397 barrels of oil, each weighing 440 pounds.

6. Mr. Jones paid $112 an acre for 160 acres of land. What was the total cost?

7. Mr. Cable packs 230 apples in a barrel. How many apples can he pack in 467 barrels?

Remember This Zero in Multiplication

1. Multiply 726 by 309. Check.

Long Way	Short Way	Check
726		309
309	726	726
6534	309	1854
000	6534	618
2178	21780	2163
224334	224334	224334

Compare the long way and the short way.

Beginners multiply the long way. Fifth graders use the short way.

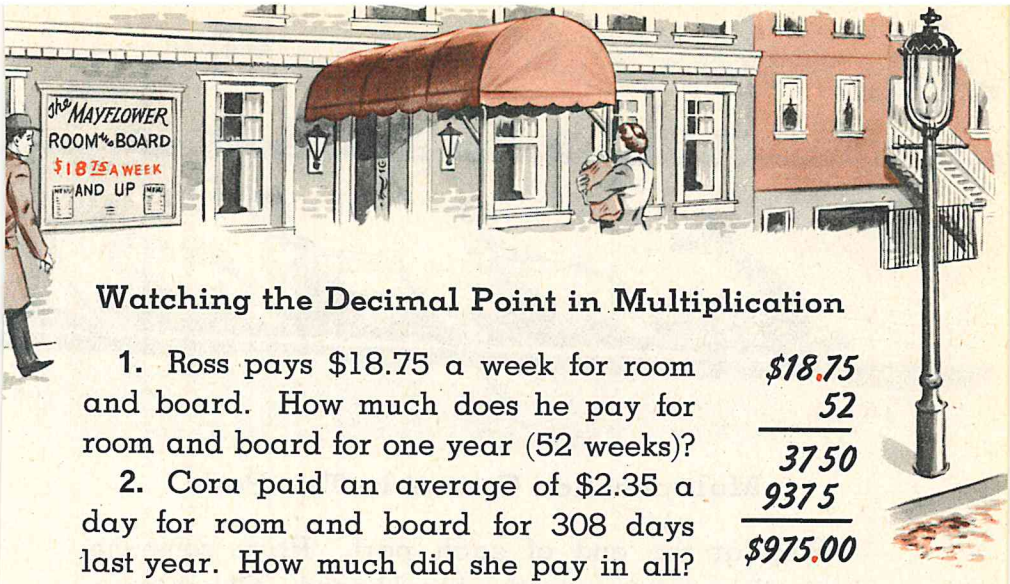
Multiply and check:

	a	b	c	d	e	f	g
2.	414	912	174	837	729	852	876
	906	304	203	108	405	607	507
3.	327	938	569	426	918	737	928
	609	404	703	304	604	205	701
4.	406	307	704	105	207	306	840
	204	603	209	703	402	507	502

Something to Understand and to Remember

Write each partial product so that its right-hand figure is exactly under the multiplier figure used to find that partial product. The 8 of 7038 is under 9 of 369. The 2 of 4692 is under 6 of 369. The 6 of 2346 is under 3 of 369.

782
369
7038
4692
2346
288558



Watching the Decimal Point in Multiplication

1. Ross pays $18.75 a week for room and board. How much does he pay for room and board for one year (52 weeks)?

2. Cora paid an average of $2.35 a day for room and board for 308 days last year. How much did she pay in all?

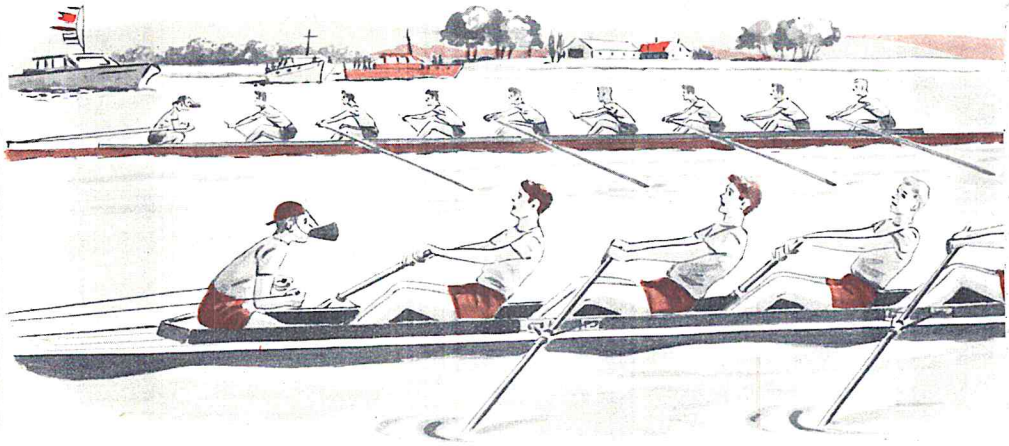
$$\begin{array}{r} \$18.75 \\ \times\ 52 \\ \hline 3750 \\ 9375 \\ \hline \$975.00 \end{array}$$

When you begin with dollars and cents in multiplication, your answer is in dollars and cents.

When you have two numbers to the right of the decimal point in the multiplicand and the multiplier is a whole number, you have two numbers to the right of the decimal point in the product. These are called decimal places.

Copy and multiply. Check by covering your work and going over it.

	a	b	c	d	e
3.	$7.38 × 84	$9.47 × 68	$5.92 × 45	$8.35 × 62	$33.54 × 283
4.	$6.29 × 324	$2.87 × 567	$9.18 × 452	$3.22 × 875	$87.96 × 345
5.	$8.43 × 608	$7.39 × 502	$3.97 × 409	$4.87 × 306	$39.62 × 427



Multiplication Contest in Two Parts

Stop at the end of each part. Have someone write the answers on the blackboard. Check your papers.

Part One

Copy and multiply. Time: 10 minutes.

	a	b	c	d	e	f	g	h
1.	78	34	59	98	$4.46	$8.48	$5.90	$7.20
	6	4	6	9	78	43	47	86
2.	34	56	43	97	$9.35	$0.82	$7.74	$3.00
	7	8	5	8	59	75	28	93

Part Two

Copy and multiply. Time: 8 minutes.

	a	b	c	d	e	f	g
3.	84	80	736	4005	208	400	600
	60	56	506	67	703	90	500
4.	530	101	230	2033	100	306	830
	508	390	69	32	578	40	175

Easy Rules for Multiplying by Numbers Ending in Zero

Write these answers quickly:

	a	b	c	d
1.	10×4	10×9	10×36	10×874

To multiply a number by 10, annex one zero to the number. To annex a zero to a number means to write a zero after the number.

2.	100×4	100×9	100×36	100×874
3.	100×7	100×8	100×43	100×582

To multiply a number by 100, annex two zeros.

4.	$1{,}000\times4$	$1{,}000\times9$	$1{,}000\times36$	$1{,}000\times874$
5.	$1{,}000\times7$	$1{,}000\times8$	$1{,}000\times43$	$1{,}000\times582$

To multiply a number by 1,000, annex three zeros.

There are also easy rules for multiplying by 20, 200, 2,000; by 30, 300, 3,000, and so on.

To multiply a number by 20, multiply by **2** *and annex one zero.*

To multiply a number by 30, multiply by **3** *and annex one zero.*

6. Give a rule for multiplying a number by 40.

7. Give a rule for multiplying a number by 500.

8. Give a rule for multiplying a number by 2,000.

Write the products:

9.	20×9	40×16	200×8	$3{,}000\times15$
10.	70×4	60×32	700×6	$9{,}000\times24$
11.	50×7	80×79	400×38	$5{,}000\times86$

Travel Problems

1. A pony express rider could average 20 miles an hour. How far could he travel in 15 hours?

2. Mr. Thompson drove his car an average of 135 miles each working day last year. If he worked 300 days in all, how many miles did he drive?

3. If Mr. Thompson can drive his car 19 miles on one gallon of gasoline, how far can he drive if he uses 200 gallons?

4. In a test flight an airplane averaged 400 miles an hour. At this rate how far did it fly in 10 hours?

5. If the boat fare to Brazil is $100, what is the total fare for 378 persons?

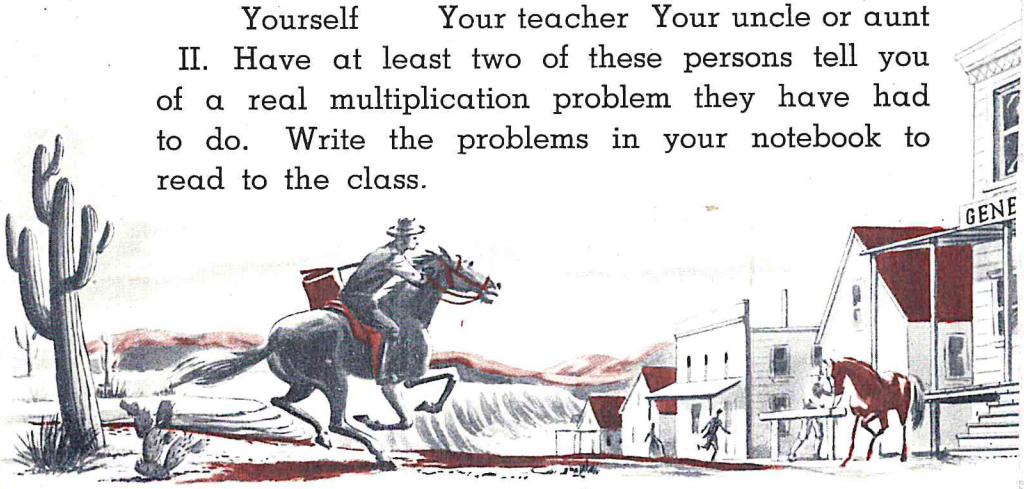
6. Mr. Gray drives an average of 400 miles a day. How far does he drive in two weeks if he drives that much every day?

For Your Notebook

I. How do these persons use multiplication in their work?

Your mother Your father The grocer
Yourself Your teacher Your uncle or aunt

II. Have at least two of these persons tell you of a real multiplication problem they have had to do. Write the problems in your notebook to read to the class.



Getting Our Division Up-To-Date

Choose three pupils to play the parts of Peggy, Bob, and Betty. Peggy is first at the blackboard. She points to a number in her first row and calls a pupil's name. The pupil tells quickly how many 5's there are in the number to which Peggy points. After several pupils have had chances, Peggy will point to numbers in the second row, and then to numbers in the third row.

Bob and Betty will then take their turns.

Peggy writes this on the blackboard:

How many?

5's in	40	20	35	25	30	10	45	15	5	0
2's in	10	2	0	12	8	14	4	16	6	18
3's in	12	3	15	27	9	24	18	6	21	0

Bob writes this on the blackboard:

How many?

4's in	16	12	4	0	24	32	28	36	8	16
6's in	30	18	24	12	0	6	36	54	42	48
7's in	49	21	56	42	14	28	63	84	35	7

Betty writes this on the blackboard:

How many?

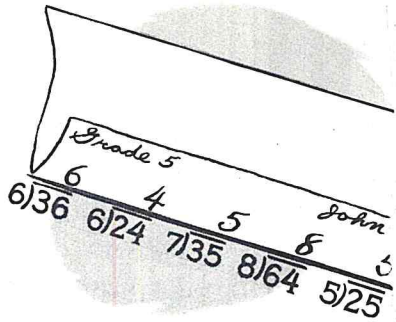
8's in	48	32	40	0	8	16	56	72	64	24
9's in	18	45	36	54	81	0	72	27	63	9

Ways to Get More Practice

1. Leave the work on the blackboard and practice during spare time.

2. Choose other pupils to play the parts of Peggy, Bob, and Betty. Play the game again.

The 90 Division Facts



You may write the quotients below on folded paper. You will hold the paper above a row of examples, instead of below the row as you have done in the past.

	a	b	c	d	e	f
1.	3)15	6)24	1)8	2)10	4)24	9)63
2.	8)40	5)45	6)54	7)42	7)35	8)72
3.	7)21	6)0	5)20	9)45	7)56	4)32
4.	7)49	8)32	7)28	9)81	6)48	9)27
5.	5)40	9)72	6)36	8)64	6)30	4)36
6.	7)63	5)35	6)42	8)56	9)36	5)25
7.	9)54	4)28	3)27	8)48	5)30	1)6
8.	1)4	3)9	6)6	3)24	9)9	3)0
9.	2)0	6)18	1)2	3)12	2)18	3)3
10.	2)14	4)4	3)21	8)8	8)0	4)12
11.	4)20	1)9	7)0	7)14	2)4	6)12
12.	8)24	5)15	9)0	2)6	1)3	3)6
13.	1)7	5)5	5)0	4)8	2)12	9)18
14.	1)5	2)16	1)0	3)18	2)2	8)16
15.	1)1	4)16	7)7	2)8	5)10	4)0

Knowing Station Numbers Helps You to Divide

How many 5's in 42 and how many over? You think back to 40, for 40 is the smaller number nearest to 42 that contains 5 an exact number of times. There are 8 5's in 40. There are 8 5's and 2 over in 42. A number, as 40, that contains the divisor an exact number of times is called a **station number.** The station numbers for 5 are:

5 10 15 20 25 30 35 40 45

1. Divide each number below by 5. First think back to the station number, and then say how many and how many over.

17 41 37 22 26 47 8 19 33

2. Write the station numbers for 6.

3. Divide each number below by 6. First think back to the station number.

32 51 44 10 35 25 7 56 23

4. Write the station numbers for 7.

5. Divide each number below by 7.

26 37 45 51 69 18 34 57 12

6. Write station numbers for 2, 3, 4, 8, 9.

No Pencils, Please

Think of the station number as you answer.

7. Jack divides 28 marbles evenly among 5 boys. How many marbles does he give each boy, and how many will Jack have left?

8. If candy bars cost 5¢ each, how many will I get for 32¢, and how much will I have left over?

How Many and How Many Over?

Choose three pupils and play as you did on page 65. The work that Peggy, Bob, and Betty will copy on the blackboard is given below. In each case the pupil called on will say **how many** and **how many over.**

Peggy writes this on the blackboard:

2's in	9	17	3	11	19	13	5	15	7
3's in	28	17	7	26	13	4	19	11	23

Bob writes this on the blackboard:

4's in	21	30	15	6	37	18	26	10	33
5's in	17	36	13	32	49	6	29	41	22
6's in	25	55	8	32	50	17	37	19	45

Betty writes this on the blackboard:

7's in	60	29	65	24	54	37	10	46	18
8's in	37	75	44	10	55	23	65	29	60
9's in	51	60	31	65	70	28	43	85	61

A New Way to Practice

The leader will point to the left of a row and will call a pupil. The pupil will say how many and how many over for each number in that row, as quickly as he can.

1. Candy bars cost 6 cents each. How many candy bars can one buy for 50 cents, and how much is left over?

2. It takes 7 yards of ribbon to trim a dress. A dressmaker has 60 yards of ribbon. How many dresses can she trim? How many yards of ribbon will be left over?

Dividing Longer Numbers

1. Divide 484 by 4. Check.

Division	Check
121 quotient Divisor 4)484 dividend	121 ×4 484

In division, the number you divide by is the divisor, the number you divide is the dividend, and the answer is the quotient.

To check division, you may multiply the quotient by the divisor. If the product is equal to the dividend, the answer checks.

Divide and check:

2. 3)936 4)844 2)482 2)684 3)639

3. 3)366 4)884 4)444 5)555 6)666

Sometimes the first figure of the dividend is too small to contain the divisor. Then we think how many times the divisor is contained in the first two figures of the dividend. As an example, the first figure of 168 is too small to contain 4. We think, How many 4's in 16.

42
4)168

4. 4)248 5)255 9)459 7)427 6)366

Get Ready for a Race

You do Row I while your partner does Row II. Who finished first? Check each other's work.

I. 6)126 5)155 3)159 2)286 8)248

II. 3)216 4)128 2)142 3)279 6)186

Thinking of the Steps We Take in Division

1. Divide 96 by 4.

First Step: **Divide** 9 by 4. The station number is 8, and the quotient figure is 2. Write **2** above 9.

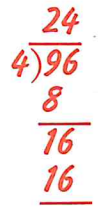
Second Step: **Multiply** divisor 4 by quotient figure 2.

Write the product **8** (which is the same as the station number) under 9.

Third Step: **Subtract** 8 from 9. Write the remainder **1** (which is the number left over) under 8.

Fourth Step: **Bring down** the next dividend figure 6 and write it beside the 1 to make 16.

Repeat the first three steps with 16 as dividend.



2. Divide 686 by 7.

First Step: The first dividend figure 6 is too small to contain the divisor 7. Think of the first two dividend figures, 68. **Divide** 68 by 7. The station number is 63, and the quotient figure is 9. Write **9** above 8.

Second Step: **Multiply** the divisor 7 by the quotient figure 9. Write the product **63** (which is the station number) under 68.

Third Step: **Subtract** 63 from 68. Write the remainder **5** under 3.

Fourth Step: **Bring down** the next dividend figure 6. This written with the remainder 5 from the third step makes a new dividend **56**.

First Step Repeated with New Dividend, 56: Divide 56 by 7. The quotient figure is 8. Write **8** above 6.

Second Step Repeated with New Dividend, 56: Multiply divisor 7 by quotient figure 8. Write the product **56** under 56.

Third Step Repeated: Subtract 56 from 56. The remainder is **0**.

$$\begin{array}{r} 98 \\ 7\overline{)686} \\ 63 \\ \hline 56 \\ 56 \\ \hline \end{array}$$

3. Divide 632 by 8.

Study the steps below. Complete the division.

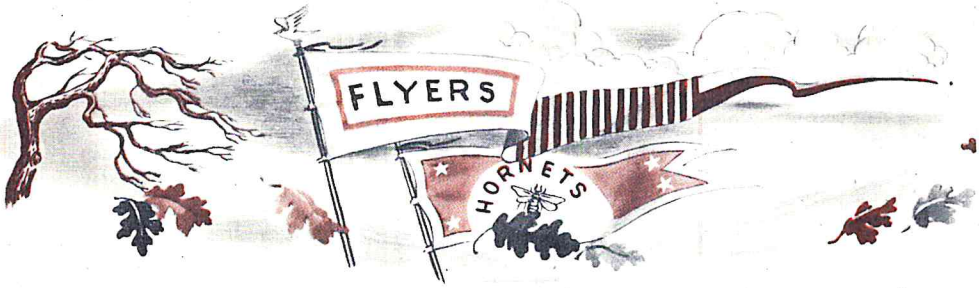
First Step Divide	Second Step Multiply	Third Step Subtract	Fourth Step Bring Down
$\begin{array}{r} 7 \\ 8\overline{)632} \end{array}$	$\begin{array}{r} 7 \\ 8\overline{)632} \\ 56 \\ \hline \end{array}$	$\begin{array}{r} 7 \\ 8\overline{)632} \\ 56 \\ \hline 7 \end{array}$	$\begin{array}{r} 7 \\ 8\overline{)632} \\ 56 \\ \hline 72 \end{array}$

4. What is meant by "Bring down"?

5. How is the "new dividend" found?

6. When you write down what you do in each step in dividing, you are doing **long division.** Study the long division examples below. Then copy the dividend and divisor of each and carry through the dividing without looking at the book.

$$\begin{array}{r} 65 \\ 5\overline{)325} \\ 30 \\ \hline 25 \\ 25 \\ \hline \end{array} \qquad \begin{array}{r} 173 \\ 4\overline{)692} \\ 4 \\ \hline 29 \\ 28 \\ \hline 12 \\ 12 \\ \hline \end{array} \qquad \begin{array}{r} 112 \\ 7\overline{)784} \\ 7 \\ \hline 8 \\ 7 \\ \hline 14 \\ 14 \\ \hline \end{array} \qquad \begin{array}{r} 424 \\ 8\overline{)3392} \\ 32 \\ \hline 19 \\ 16 \\ \hline 32 \\ 32 \\ \hline \end{array}$$



Pennant Races in Division

Divide the class into two teams. After each race write the division correctly on the blackboard. Will the Hornets or the Flyers win? Study the four long division examples at the bottom of page 71 carefully before these races begin.

Race I. Copy and divide.

	a	b	c	d	e	f
1.	$6\overline{)174}$	$5\overline{)395}$	$6\overline{)210}$	$4\overline{)388}$	$6\overline{)456}$	$7\overline{)2345}$
2.	$5\overline{)185}$	$6\overline{)504}$	$5\overline{)290}$	$5\overline{)275}$	$6\overline{)282}$	$8\overline{)6584}$
3.	$6\overline{)594}$	$6\overline{)570}$	$6\overline{)474}$	$4\overline{)192}$	$3\overline{)192}$	$4\overline{)2588}$
4.	$6\overline{)468}$	$5\overline{)445}$	$5\overline{)370}$	$4\overline{)268}$	$6\overline{)408}$	$4\overline{)3456}$

Race II. Copy and divide:

1.	$5\overline{)195}$	$2\overline{)586}$	$3\overline{)753}$	$4\overline{)312}$	$5\overline{)345}$	$4\overline{)2368}$
2.	$6\overline{)294}$	$5\overline{)475}$	$6\overline{)204}$	$5\overline{)240}$	$6\overline{)564}$	$6\overline{)2280}$
3.	$3\overline{)462}$	$2\overline{)752}$	$3\overline{)882}$	$5\overline{)485}$	$6\overline{)390}$	$5\overline{)4905}$
4.	$8\overline{)656}$	$7\overline{)371}$	$8\overline{)192}$	$9\overline{)198}$	$9\overline{)297}$	$7\overline{)4704}$

First Call to the Rifle Range

Every right answer hits a bulls-eye.

Write the products on folded paper:

	a	b	c	d	e	f	g
1.	900 ×3	800 ×5	400 ×9	500 ×4	300 ×7	600 ×8	700 ×6
2.	807 ×7	503 ×2	606 ×9	401 ×6	309 ×8	204 ×3	708 ×4

Copy and multiply:

3.	513 480	947 360	655 740	826 430	792 430	274 670	418 160
4.	270 348	550 897	630 443	490 876	320 759	470 328	980 279

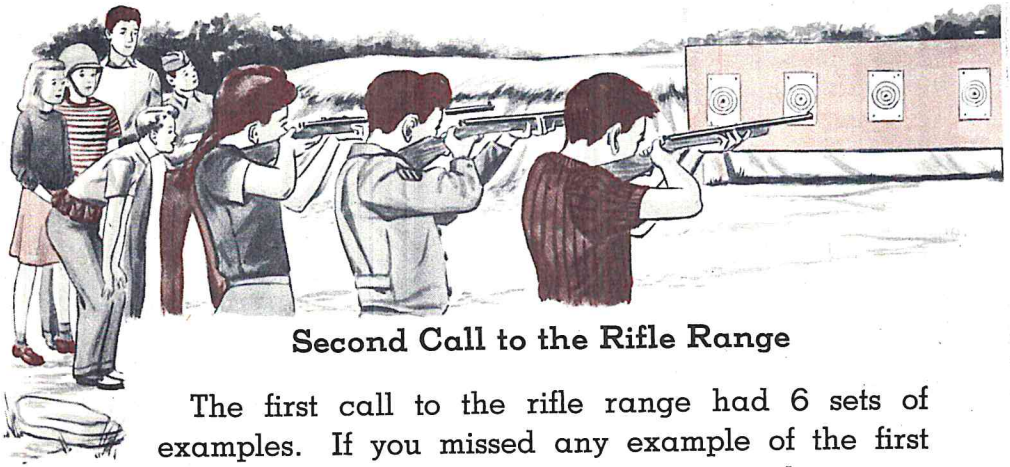
Copy and divide:

5. $7\overline{)469}$ $6\overline{)738}$ $8\overline{)376}$ $4\overline{)792}$ $9\overline{)756}$

6. $5\overline{)845}$ $3\overline{)741}$ $6\overline{)864}$ $7\overline{)294}$ $9\overline{)549}$

You had 38 chances to hit a bulls-eye on this page. If you hit at least 34 bulls-eyes, you are a sharpshooter. Turn to page 75 for new targets.

If you missed more than 4 shots, try page 74.



Second Call to the Rifle Range

The first call to the rifle range had 6 sets of examples. If you missed any example of the first set, study page 63 again. If you missed any example of the second set, study page 58 again. If you missed any example of the third or fourth set, study page 59. If you missed any example of the fifth or sixth set, study pages 70, 71, and 72. Study the pages that you need before doing the examples below.

1. Copy and multiply:

46	645	1,007	136	317	851	396
32	59	3	9	70	304	740

2. Write the products quickly:

800×4 700×8 43×200 120×400

Copy and multiply:

3.

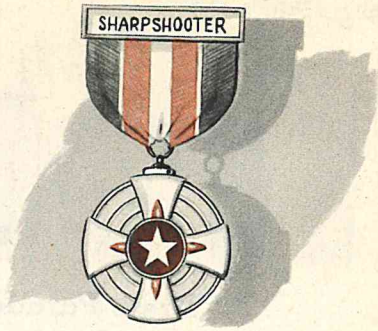
\$4.15	\$7.00	\$4.20	\$10.05	\$13.49
6	5	86	23	57

Copy and divide:

4. $3\overline{)252}$ $6\overline{)390}$ $7\overline{)203}$ $3\overline{)234}$ $4\overline{)348}$ $6\overline{)5688}$

5. $5\overline{)330}$ $7\overline{)455}$ $9\overline{)891}$ $9\overline{)792}$ $7\overline{)406}$ $4\overline{)4600}$

Targets for Sharpshooters



1. Help a pupil who needs your help. The first step in helping anyone is to find out the kind of mistakes he makes. He should then do the kind of practice that will keep him from making the same mistake again.

2. Challenge another sharpshooter to a multiplication duel. The weapons will be pencils and paper. Agree upon multiplication exercises you will work. Work as fast as you can without making mistakes. Both will stop when the first one has finished. The one who has more correct answers wins.

3. Boys! Make up five multiplication problems that a Boy Scout Troop of 65 might have to solve when getting ready for a camping trip.

4. Girls! Make up five multiplication problems that a Girl Scout Troop might have to solve in buying and dressing 135 dolls for poor children.

5. Choose a committee to select the best ten problems. Judge problems according to these points:

a. Could the problem really happen?

b. Is the problem clearly stated?

c. Are the spelling and writing well done?

6. Copy the winning problems on the blackboard for the whole class to solve.

Dress Parade—Review of Unit 3

All pupils will do this page. Think whether you should add, subtract, multiply, or divide.

1. If I drive 424 miles on Monday and 226 miles on Tuesday, how many miles do I drive on both days?

2. If a reader costs $.49, how much will 85 readers cost?

3. A man had $972.13 in a bank and drew out $27.75. How much did he have in the bank then?

4. Mary divided 135 sheets of colored paper equally among 9 pupils. How many sheets did each pupil get?

5. John counted the colored paper on the shelf in the storeroom. He said there were 145 red sheets, 45 blue sheets, 6 white sheets, 23 black sheets, and 104 yellow sheets. How many sheets did he count?

6. Father said he earned $1,674 in 6 months. If he earned the same amount each month, how much did he earn a month?

7. If there are 26 pages in each unit of a book, how many pages are in 12 units?

Problems Which Ask Two Questions

Some problems ask two questions. You must find the right answer to the first question before you can find the answer to the second question.

1. The regular price of sweaters is $5.00. The Star Store had a sale. It sold 324 sweaters at $3.98 each. By how much was the price of each sweater reduced? What was the reduction on all the sweaters?

2. Last year the Lakeside Hotel bought 726 hand towels and 209 bath towels. The price of each was $.29. How many towels did the hotel buy in all? How much did all the towels cost?

3. The Star Store sold 185 pairs of stockings last month, and has sold 132 pairs this month. Each pair was sold for $1.19. How many pairs did the Star Store sell in all? What was the selling price of all the stockings?

Hidden Questions in Two-Step Problems

In some problems two questions must be answered, but only one of the questions is asked. The other is a hidden question you must answer before you can answer the question the problem asks. These are called **two-step problems.**

First Step: Find the hidden question and answer it.

Second Step: Answer the question the problem asks.

Work these two-step problems.

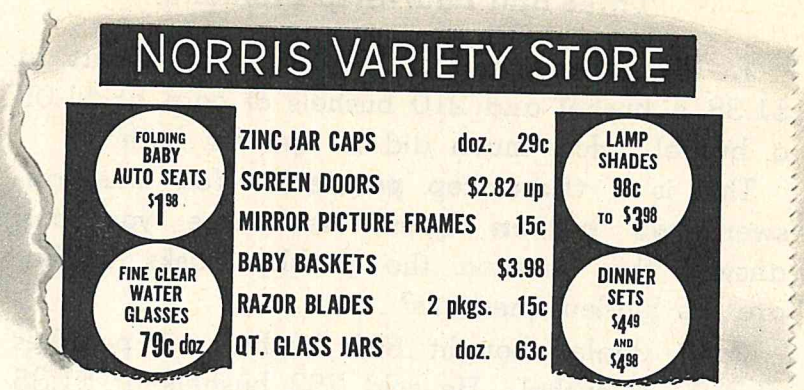
1. Farmer Jones sold 834 pounds of Irish potatoes and 206 pounds of sweet potatoes. He sold both kinds for $.03 a pound. How much did he get for all the potatoes?

Hidden question: How many pounds did he sell altogether?

2. Mr. Jackson sold 538 sacks of white flour and 165 sacks of whole wheat flour. He sold both kinds at $1.65 a sack. How much did he get for all the flour?

3. Mr. Jackson sold fancy apples at $2.35 a box. He had 1,000 boxes on Monday. At the end of the week he had 92 boxes left. How much did he get for the boxes that he sold?

4. Farmer Jones sold 125 chickens Monday, 53 chickens Tuesday, and 212 chickens Wednesday. If he sold them at $1.50 each, how much did he get for all of them?


NORRIS VARIETY STORE
FOLDING BABY AUTO SEATS $1.98
FINE CLEAR WATER GLASSES 79c doz
ZINC JAR CAPS doz. 29c
SCREEN DOORS $2.82 up
MIRROR PICTURE FRAMES 15c
BABY BASKETS $3.98
RAZOR BLADES 2 pkgs. 15c
QT. GLASS JARS doz. 63c
LAMP SHADES 98c TO $3.98
DINNER SETS $4.49 AND $4.98

Two-Step Shopping Problems

1. If Jane bought 2 dozen zinc jar caps and a dozen quart size glass jars at the Norris Variety Store, what was the amount of her bill?

2. Mother bought a baby seat and a baby basket. What change will she get from $10?

3. Father bought 2 packages of razor blades at the price shown above. Last week the Norris Variety Store wanted 25¢ a package for the same blades. How much did Father save?

4. Mary bought a dinner set for $4.49 and 2 doz. water glasses. How much did she spend?

5. Betty bought 2 mirror picture frames and a lamp shade for $3.98. How much did she spend?

6. Betty's mother bought 2 of the less expensive dinner sets. How much more would she have paid if she had bought 2 of the more expensive sets?

Three and Four-Step Problems

1. Mr. Adams sold 146 bushels of wheat at $1.38 a bushel and 210 bushels of corn at $1.05 a bushel. How much did he get for both?

This is a **three-step problem.** You must answer **two hidden questions** before you can answer the question the problem asks. What are the hidden questions?

2. A dealer bought 800 bushels of peaches at $.90 a bushel. He sold 752 bushels at $1.35 a bushel. The rest of the peaches spoiled. How much profit did he make on this deal?

3. Mr. Brown bought 5 rolls of wire at $12 a roll and 8 rolls of wire at $15 a roll. How much did he pay for all the wire?

4. Mr. Carr sold 12 chickens at $1.75 each, 15 at $1.50, and 18 at $1.35. How much did he receive for all the chickens?

This is a **four-step question.** You must answer **three hidden questions** besides the question the problem asks.

5. There are 30 dozen eggs in a case. Mr. Carr sold 12 dozen from the case for $.35 a dozen. He sold the rest of the case at $.40 a dozen. How much did he get for the whole case?

6. Mr. Carr bought 300 melons. 75 were very ripe and he had to sell them at 10¢ each. If he sold the rest at $.35 each, how much did he get in all?

Finding Equal Parts of Numbers

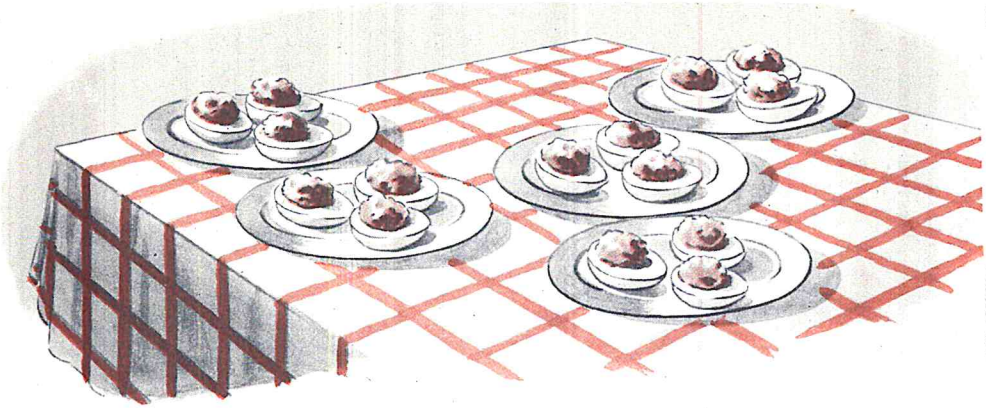
Mary has baked 12 cup cakes. She put chocolate icing on one-half of them and white icing on the other one-half of them

You write one-half as $\frac{1}{2}$. To find $\frac{1}{2}$ of a number, you divide the number by 2: $\frac{1}{2}$ of 12 is 6.

If Mary had wanted to put chocolate icing on one-third of the cup cakes, she would divide 12 into 3 equal parts. To find $\frac{1}{3}$ of a number, you divide the number by 3: $\frac{1}{3}$ of 12 is 4. Draw a picture showing $\frac{1}{3}$ of the cup cakes with chocolate icing on them.

1. How would Mary find one-fourth ($\frac{1}{4}$) of 12 cup cakes? Draw a picture showing $\frac{1}{4}$ the cup cakes Mary baked with chocolate icing on them.

2. How would Mary find one-sixth ($\frac{1}{6}$) of 12 cup cakes? Draw a picture showing $\frac{1}{6}$ of Mary's cakes with chocolate icing.



Finding Equal Parts at a Picnic

1. The children at the picnic had 15 stuffed eggs in all. Only 5 children wanted stuffed eggs. How did Mary find the number of eggs to put on each of the 5 plates? What part of the eggs will each of the 5 children receive?

2. Divide 24 jam sandwiches among 12 children. How many will each child receive?

3. Find $\frac{1}{8}$ of 24 chocolate bars.

4. There are 32 apples to be divided equally among 8 children. How many apples will each child get? What part will each child get?

5. There are 12 large bananas. How many will each child get if the bananas are divided equally among 4 children? What part will each child get?

Say these answers quickly:

6.	$\frac{1}{4}$ of 20	$\frac{1}{3}$ of 27	$\frac{1}{2}$ of 14	$\frac{1}{6}$ of 30
7.	$\frac{1}{5}$ of 30	$\frac{1}{2}$ of 28	$\frac{1}{6}$ of 72	$\frac{1}{8}$ of 64
8.	$\frac{1}{6}$ of 42	$\frac{1}{5}$ of 35	$\frac{1}{4}$ of 84	$\frac{1}{5}$ of 60
9.	$\frac{1}{8}$ of 40	$\frac{1}{6}$ of 48	$\frac{1}{3}$ of 36	$\frac{1}{2}$ of 46

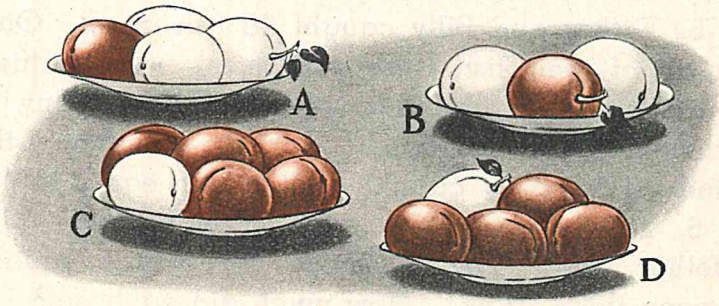
Learning About Fractions

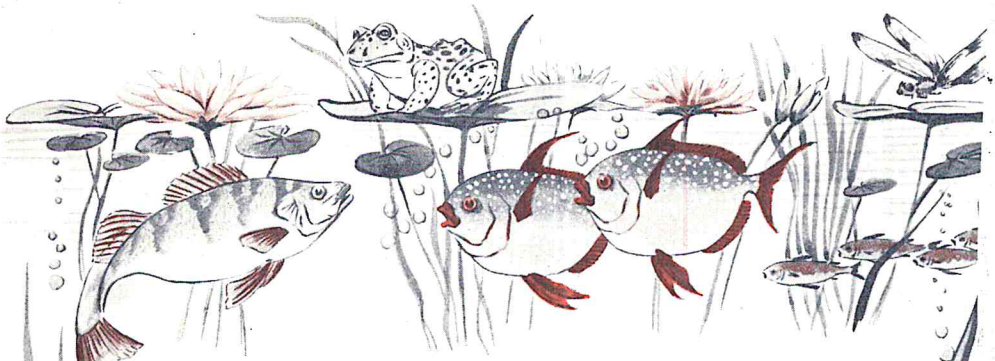
Numbers like $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$ are called **fractions.** A fraction is a part of a whole. *The whole may be one thing* like a big round cake. What would you mean by $\frac{1}{2}$ of a cake? By $\frac{1}{4}$ of a cake? By $\frac{1}{8}$ of a cake?

The whole may be a number of things as a dozen ripe peaches. What would you mean by $\frac{1}{2}$ of 12 ripe peaches? By $\frac{1}{3}$ of 12 ripe peaches? By $\frac{1}{6}$ of 12 ripe peaches?

Here are four plates of plums. Some of the plums are red and some are white. There are 4 plums on plate A. One-fourth ($\frac{1}{4}$) of the plums are red, because there is 1 red plum out of 4 plums in all.

1. What part of the plums on plate B are red?
2. What part of the plums on plate C are white?
3. What part of the plums on plate D are white?
4. Draw a plate of 8 plums. Color $\frac{1}{8}$ of them red
5. Draw 12 Easter eggs. Color $\frac{1}{2}$ of them red.
6. Draw 15 marbles. Color $\frac{1}{3}$ of them red.





Fractions on a Fishing Trip

1. Father and Mother took Sally and Billy on a fishing trip. Mother had made 36 sandwiches. One-fourth of them were ham sandwiches. How many ham sandwiches had Mother made?

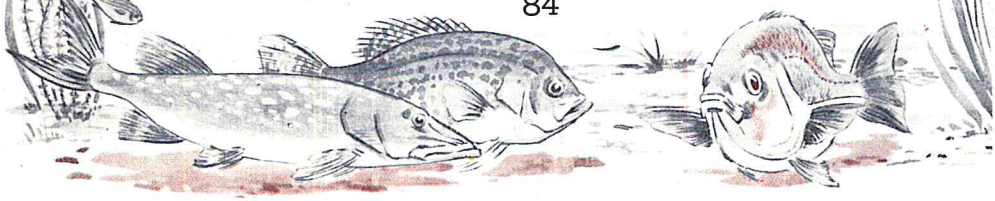
2. Father bought a 12-quart minnow bucket. He filled it $\frac{1}{2}$ full of water. How many quarts of water did he put in the bucket?

3. Billy bought 100 minnows. He put $\frac{1}{4}$ of them in his own minnow bucket. How many minnows did he put in his minnow bucket?

4. The trip to the lake was 120 miles. They stopped for supper after they had gone $\frac{1}{3}$ of the way. How many miles did they go before supper?

5. Father and Billy caught 48 fish in all. One-fourth of their fish were sunfish, $\frac{1}{6}$ were catfish, $\frac{1}{3}$ bass, $\frac{1}{8}$ perch, and $\frac{1}{8}$ pike. How many of each kind did they catch? Add the numbers of the kinds of fish they caught. Is the sum equal to 48?

6. Father and Billy sold some fish for $12. Mother said, "Let us divide the money equally among the 4 of us." How much did each get?

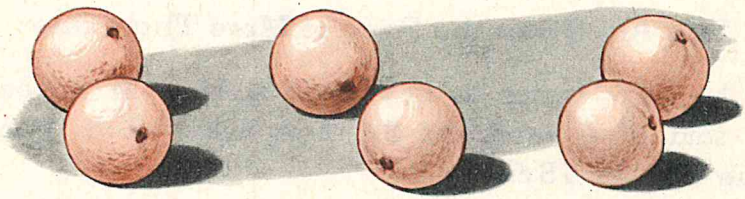


When You Are Given the Price of More Than One

A storekeeper may say "Oranges are 5 cents each," or he may say "Oranges are two for 9 cents." Of course, if you buy only one orange, you will have to pay 5 cents for it, whichever price the storekeeper says. The oranges are cheaper if you buy more than one.

1. If oranges are priced at 2 for 9¢, what must I pay for 6 oranges?

Think how many 2's are in 6. There are 3. Then I must pay 3 times 9¢, or 27¢, for 6 oranges.



2 oranges 9¢ 2 oranges 9¢ 2 oranges 9¢

3 times

2 oranges)6 oranges $3 \times 9¢ = 27¢$

2. If oranges are priced at 2 for 9¢, what must I pay for 10 oranges? For 12 oranges?

3. If candy bars are priced at 3 for 10¢, what must I pay for 12 candy bars? For 9 candy bars?

4. If I can buy 2 packages of gum for 5 cents, what must I pay for 6 packages? For 8 packages?

5. If pencils are priced at 4 for 5¢, what must I pay for 12 pencils? For 8 pencils?

You Are Given the Price of More Than One

1. Mary wants to buy some ribbon. If ribbon is sold at 4 yards for 5¢, how many yards can she buy for 15¢?

Think how many times 5¢ is contained in 15¢. The answer is 3. Then you can buy 3 times 4 yards, or 12 yards for 15¢.

2. Mary wants to buy some lace for a dress. If she can get 3 yards for 10¢, how many yards can she get for 50¢?

3. Ann bought hair pins. If she paid 9¢ for 2 boxes, how many boxes did she get for 36¢?

4. Peggy bought $2.00 worth of towels. If towels cost 3 for $1.00, how many did she buy?

Easy Two-Step Problems

No pencils, please.

1. Billy had 50¢. He spent 10¢ for candy and 5¢ for popcorn. How much money did he have left?

2. Terry had 25¢. If he bought 4 bars of candy at 3¢ each, how much money did he have left?

3. Tom earned 35¢ last week and 50¢ this week. How much has he left if he spent 20¢?

4. Mother baked two cakes. She cut one cake into 10 pieces and the other into 12 pieces. How many pieces did she have left if the children ate half of the pieces?

5. Mary cut 2 loaves of bread into slices. If there were 16 slices in each loaf, how many children can she serve if each child eats 4 slices?

6. Ann uses 2 slices of bread to make a sandwich. How many sandwiches can she make from 3 loaves of bread if each loaf is cut into 12 slices?

7. Mary baked 3 pies. She cut 2 pies into 6 pieces each and 1 pie into 5 pieces. How many pieces of pie did she have in all?

8. Mother baked 36 cookies. Ann ate 6 cookies and then put half of what was left on a plate for lunch. How many cookies were there on the plate?

9. Mother cut a loaf of bread into 16 slices. Terry ate 2 slices. Mother toasted half of what was left. How many slices did she toast?

Dividing Numbers Having Dollars and Cents

1. If five books cost $6.75, how much will one book cost?

$$\begin{array}{r} \$1.35 \\ 5\overline{)\$6.75} \\ 5 \\ \hline 17 \\ 15 \\ \hline 25 \\ 25 \\ \hline \end{array}$$

The steps in dividing dollars and cents are the same as in other dividing. The quotient number is dollars and cents. Remember to write a dollar sign before the quotient number. Remember to place a decimal point in the quotient number exactly above the decimal point in the dividend.

2. Study these examples. Then copy the dividend and the divisor of each and do the dividing without looking at the book.

$$\begin{array}{r} \$0.29 \\ 6\overline{)\$1.74} \\ 12 \\ \hline 54 \\ 54 \\ \hline \end{array} \qquad \begin{array}{r} \$2.49 \\ 4\overline{)\$9.96} \\ 8 \\ \hline 19 \\ 16 \\ \hline 36 \\ 36 \\ \hline \end{array} \qquad \begin{array}{r} \$.18 \\ 5\overline{)\$.90} \\ 5 \\ \hline 40 \\ 40 \\ \hline \end{array} \qquad \begin{array}{r} \$1.25 \\ 4\overline{)\$5.00} \\ 4 \\ \hline 10 \\ 8 \\ \hline 20 \\ 20 \\ \hline \end{array}$$

3. If 9 books cost $7.65, what is the cost of 1 book?

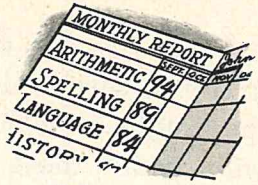
4. Mother divided $1.95 equally among 3 children. How much did each child receive?

Copy and divide.

5. $7\overline{)\$9.24}$ $3\overline{)\$.96}$ $2\overline{)\$3.96}$ $4\overline{)\$7.76}$ $9\overline{)\$12.78}$

6. $5\overline{)\$6.85}$ $4\overline{)\$1.28}$ $6\overline{)\$.72}$ $7\overline{)\$1.54}$ $8\overline{)\$25.84}$

Finding an Average Is a Two-Step Problem



John said, "I thought my average in spelling was more than 89. On one test I made 93 and on another I made 91."

"Let us see," said his teacher. "To find your average we must add all your tests together, and then divide by the number of tests."

Add

85 first test
87 second test
91 third test
93 fourth test
356 total

Divide

89 average
4)356
32
36
36

1. Did the teacher make any mistake?

2. Find the average grade for each of these pupils. *This means you will divide the sum of the grades by the number of grades.*

Jack	Mark	Tom	Alice	Mary	Joan
95	75	100	82	95	
92	77	95	100	90	65
95	88	90	88	85	89

3. Find the average score for each of these players. *This means you will divide the sum of the scores by the number of scores.*

Jack	Mark	Tom	Alice	Mary	Joan
8	6			6	3
8	2	3	8	4	4
7	0	2	2	9	6
5	8	7	2	5	7

Understanding and Finding Averages

1. Divide the class into groups of 5. Let each group choose a leader. The leader will measure the height in inches of each one in his group. He will record these heights on the blackboard and find the average height of his group.

2. The leader will also find the weight of each one in his group, and will find the average weight.

3. Find the average age of each group.

4. What is meant by "batting average"? Name a ball player who has a high batting average.

5. How could you find the average noon temperature for a week?

6. Make a record of the temperature at exactly 12 o'clock each day for a week. Use these records to find the average temperature for the week.

7. Rainfall at a given place is measured in inches. The yearly rainfall is the number of inches deep the water would stand if all the rain and snow that fell in a year remained where it fell. How would the average yearly rainfall of a given place be found? Look up the average yearly rainfall in your state.

8. In one place the rainfall for a year was 41 inches, for the next year 47 inches, for the next year 46 inches, for the next year 36 inches, and for the next year 45 inches. What was the average yearly rainfall for these five years?

Dividing When Remainders Are Left

When one number is divided by another, there may be a number left over. This number is called a **remainder.** Study the examples below. Then copy the dividends and divisors and see if you can do the dividing without looking at the book. A remainder of 2 is shown as "r—2."

$$\begin{array}{r} 15 \text{ r—2} \\ 4\overline{)62} \\ 4 \\ \hline 22 \\ 20 \\ \hline 2 \end{array} \qquad \begin{array}{r} 27 \text{ r—1} \\ 3\overline{)82} \\ 6 \\ \hline 22 \\ 21 \\ \hline 1 \end{array} \qquad \begin{array}{r} 64 \text{ r—2} \\ 6\overline{)386} \\ 36 \\ \hline 26 \\ 24 \\ \hline 2 \end{array} \qquad \begin{array}{r} 72 \text{ r—3} \\ 8\overline{)579} \\ 56 \\ \hline 19 \\ 16 \\ \hline 3 \end{array}$$

Divide. Write out all steps. Find quotients and remainders.

1. $2\overline{)59}$ $3\overline{)76}$ $4\overline{)93}$ $3\overline{)59}$ $4\overline{)75}$

2. $5\overline{)173}$ $6\overline{)215}$ $7\overline{)324}$ $6\overline{)194}$ $7\overline{)528}$

3. Mr. Martin has 587 sticks of candy. If he puts 6 sticks in each bag, how many bags can he fill, and how many sticks will be left over?

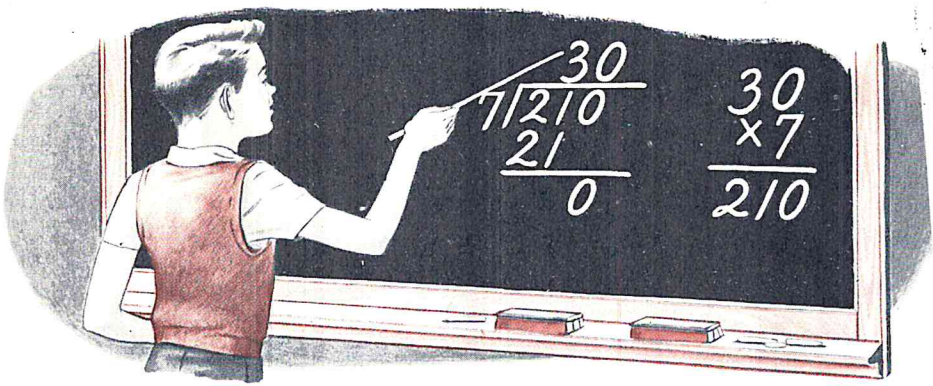
Division

$$\begin{array}{r} 97 \text{ r—5} \\ 6\overline{)587} \\ 54 \\ \hline 47 \\ 42 \\ \hline 5 \end{array}$$

Check

97 quotient
x6 divisor
582
Add 5 remainder
587 dividend

4. Check each of the examples in 1, 2, and 3.



Zero at the End of the Quotient

1. Mr. Drake gave 240 stamps to a boys' stamp club. There are 6 boys in the club. If the stamps are divided equally, how many stamps will each boy get? Check your answer.

2. The stamp club then bought 182 rare stamps. If these are divided equally among the 6 boys, how many stamps will each boy get and how many stamps will be left over? Check your answer.

Divide and check:

	a	b	c	d	e
3.	$6\overline{)360}$	$9\overline{)450}$	$8\overline{)560}$	$7\overline{)420}$	$5\overline{)350}$
4.	$4\overline{)242}$	$7\overline{)354}$	$9\overline{)817}$	$8\overline{)402}$	$3\overline{)151}$
5.	$6\overline{)3720}$	$9\overline{)4860}$	$7\overline{)3010}$	$5\overline{)2950}$	$8\overline{)7760}$

6. Mrs. Simmons has 327 cans of vegetables. If she uses 8 cans a week, how many weeks will they last? Will there be any left over? Check.

7. Mr. Hale owes $425. If he pays it at the rate of $7 a week, how many weeks will it take him to pay what he owes? How many dollars will he have to pay the last week?

Tie a Red Flag to This Zero

The zero that comes within a quotient is a trouble maker. Tie a red flag on it, so that you will not forget it and leave it out.

1. Our stamp club ordered 1,435 foreign stamps. How many stamps will each of the 7 members get?

There are 2 7's in 14. Write **2** above 4.
There are 0 7's in 3. Write **0** above 3.
There are 5 7's in 35. Write **5** above 5.
You can check by multiplying 205 by 7.

```
   205
7)1,435
  14
   3
   0
  35
  35
```

2. Last month our stamp club received 2,155 new stamps. If they were divided equally among the 7 members of the club, how many stamps would each member get? How many stamps would be left over?

There are 3 7's in 21. Write **3** above 1.
There are 0 7's in 5. Write **0** above 5.
There are 7 7's and 6 over in 55. Write **7** above 5, and write **6** for remainder.
You can check by multiplying 307 by 7 and adding 6 to the product.

```
   307 r-6
7)2,155
  21
   5
   0
  55
  49
   6
```

Divide and check:

3. 8)3264 7)3514 4)416 9)5463 3)315

4. 6)4254 5)4035 9)927 8)4840 7)742

5. 7)1437 8)5668 6)625 5)3518 9)950

6. 9)2740 8)3230 3)320 4)3630 4)835

Watch the Scoreboard

Row 1	𝍸 /
Row 2	////
Row 3	𝍸 𝍸

After each section, check your answers. The scorekeeper will give your row as many tallies as there are perfect papers in it. Help your row to have the largest total score.

Section A

1.	$4\overline{)3892}$	$7\overline{)6685}$	$9\overline{)2898}$	$5\overline{)1965}$	$7\overline{)4396}$
2.	$9\overline{)7146}$	$8\overline{)5192}$	$7\overline{)4886}$	$9\overline{)7866}$	$8\overline{)6248}$
3.	$7\overline{)6671}$	$6\overline{)5472}$	$9\overline{)8343}$	$7\overline{)4676}$	$6\overline{)4374}$
4.	$4\overline{)1832}$	$8\overline{)7656}$	$9\overline{)3906}$	$7\overline{)5376}$	$6\overline{)3258}$

Section B

5.	$3\overline{)\$5.55}$	$6\overline{)\$5.58}$	$7\overline{)\$15.61}$	$2\overline{)\$52.12}$
6.	$6\overline{)\$39.72}$	$5\overline{)\$4.95}$	$3\overline{)\$16.35}$	$8\overline{)\$.96}$
7.	$2\overline{)\$34.62}$	$8\overline{)\$37.84}$	$4\overline{)\$26.32}$	$5\overline{)\$426.45}$
8.	$4\overline{)\$27.84}$	$7\overline{)\$25.62}$	$5\overline{)\$21.40}$	$3\overline{)\$85.32}$

Section C

9.	$6\overline{)536}$	$8\overline{)187}$	$7\overline{)245}$	$9\overline{)671}$	$9\overline{)315}$
10.	$8\overline{)587}$	$6\overline{)432}$	$7\overline{)671}$	$5\overline{)324}$	$6\overline{)173}$
11.	$8\overline{)725}$	$9\overline{)493}$	$7\overline{)405}$	$8\overline{)672}$	$4\overline{)304}$

Section D

12. $9\overline{)2835}$ $7\overline{)1393}$ $2\overline{)1846}$ $8\overline{)7856}$ $9\overline{)7731}$

13. $7\overline{)3759}$ $6\overline{)5706}$ $5\overline{)3740}$ $4\overline{)2764}$ $8\overline{)5536}$

14. $2\overline{)5768}$ $4\overline{)9324}$ $5\overline{)8565}$ $3\overline{)7644}$ $6\overline{)8934}$

15. $7\overline{)4562}$ $9\overline{)7765}$ $8\overline{)6776}$ $6\overline{)3957}$ $9\overline{)8293}$

Section E

16. Mother spent \$1.00 for hair nets. If hair nets cost 2 for 25¢, how many did she buy?

17. A dressmaker paid 45¢ for buttons. If buttons sell at the rate of 2 cards for 15¢, how many cards did she buy?

18. Sugar sells at 4 lb. for 25¢. How many pounds can you buy for \$1.00?

19. A school bought 7 hams for a picnic. The hams weighed 13, 18, 22, 19, 28, 16, and 17 pounds. What was the average weight of the hams?

20. Tom sold 20 picnic tickets, Mary sold 50, and Joan sold 59. What was the average number sold per pupil?

21. If oranges sell at 3 for 10¢, how much will I pay for 9 oranges?

22. If apples sell at 4 for 5¢, how many apples can I buy for 20¢?

23. Jack got grades of 87, 72, and 93 in spelling. What was his average grade?

24. A fast train traveled 348 miles in 6 hours. What was the average speed per hour?

Dividing by 2-Figure Numbers

1. How many boards each 20 inches long can be cut from a board 60 inches long?

$$20\overline{)60}\quad 3,\ 60,\ 0$$

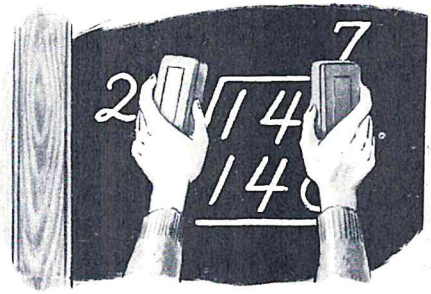
The answer is 3. Write **3** above the zero in 60.

The station numbers for 20 are the numbers that contain 20 an exact number of times. The station numbers for 20 are like the station numbers for 2, except each station number for 20 has a 0 at the right. Compare the station numbers for 2 and for 20.

For 2 : 2 4 6 8 10 12 14 16 18
For 20: 20 40 60 80 100 120 140 160 180

In dividing by 20, we do not need to think of the whole number 20. We think of the 2 only. We did not think of the whole number 60, either, when we divided 60 by 20. We thought of the 6 only.

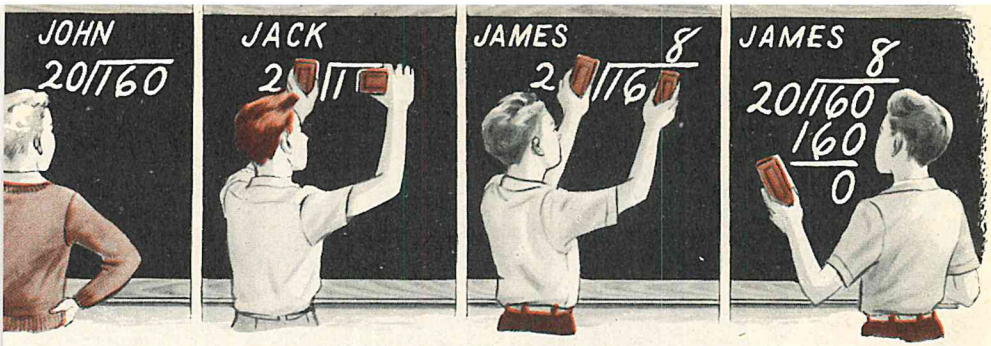
2. Divide 140 marbles equally among 20 boys.



When working on the blackboard, use blackboard erasers to cover the parts of numbers you do not need.

There are 7 2's in 14 and 7 20's in 140. Write the quotient figure 7 above the 0 of 140.

The answer checks, for 7×20 equals 140.



More About 2-Figure Divisors

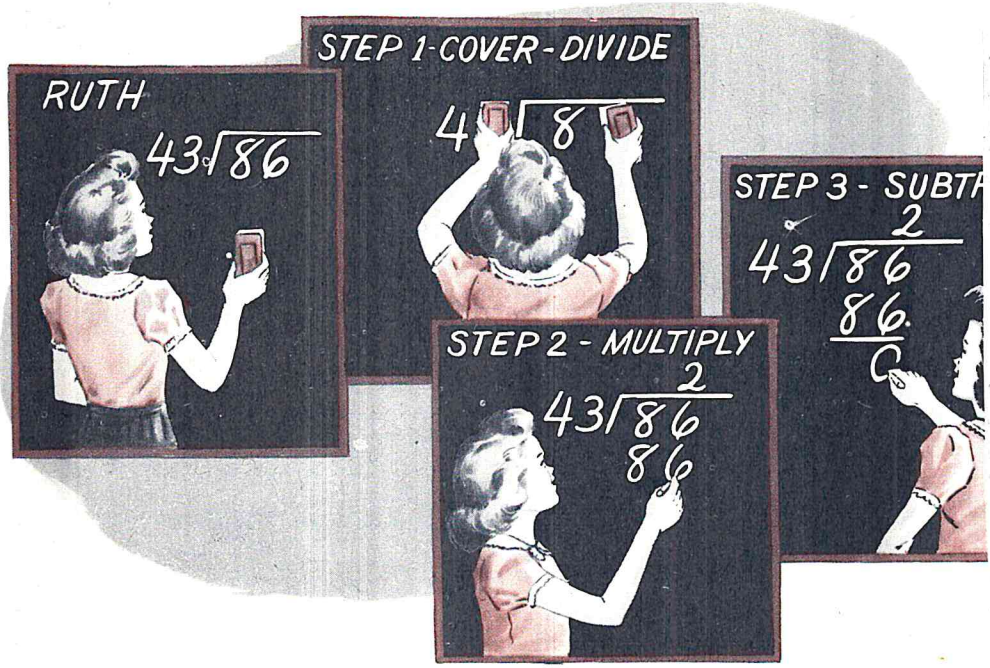
John does not know how to begin. He must have been absent yesterday. Jack has started wrong. James thinks fast and remembers what he has learned. He will divide 16 by 2 to find the quotient 8. Since he is really dividing 160 by 20, he will write the **8** above the 0 of 160. His work is completed in the last picture.

Choose someone to go to the blackboard with two erasers and to divide the examples below, as James divided his example.

1. $20\overline{)120}$ **2.** $20\overline{)180}$ **3.** $30\overline{)180}$ **4.** $40\overline{)240}$

Copy and divide:

	a	b	c	d	e
5.	$30\overline{)120}$	$30\overline{)150}$	$30\overline{)270}$	$30\overline{)240}$	$30\overline{)180}$
6.	$40\overline{)160}$	$40\overline{)360}$	$50\overline{)250}$	$50\overline{)150}$	$60\overline{)240}$
7.	$60\overline{)360}$	$50\overline{)300}$	$70\overline{)490}$	$90\overline{)180}$	$90\overline{)360}$
8.	$60\overline{)120}$	$80\overline{)240}$	$70\overline{)350}$	$80\overline{)160}$	$70\overline{)280}$
9.	$90\overline{)270}$	$70\overline{)420}$	$60\overline{)540}$	$70\overline{)210}$	$80\overline{)640}$



Two-Figure Divisors that Do Not End in 0

Watch Ruth divide. She places her erasers as we have been doing. She thinks, "How many 4's in 8?" The answer, of course, is 2.

In finding the quotient figure, Ruth thinks only of the first figure 8 of the dividend and the first figure 4 of the divisor. Since she is really dividing 86 by 43, she writes the quotient **2** above the 6 of 86.

Example: Divide 728 by 91.

Since the first figure 7 is smaller than 9, use the first two figures, 72, of the dividend. Write this quotient figure **8** above the 8 of 728.

$$\begin{array}{r} 8 \\ 91\overline{)728} \\ \underline{728} \end{array}$$

Division Contest

Each row of pupils will choose someone who divides well for captain. After each five divisions the captains will put the work on the blackboard for you to check your divisions.

Copy and divide:

	a	b	c	d	e
1.	$22\overline{)44}$	$41\overline{)82}$	$23\overline{)46}$	$44\overline{)88}$	$31\overline{)62}$
2.	$42\overline{)84}$	$34\overline{)68}$	$32\overline{)64}$	$21\overline{)42}$	$33\overline{)66}$
3.	$24\overline{)48}$	$21\overline{)63}$	$32\overline{)96}$	$23\overline{)69}$	$31\overline{)93}$
4.	$22\overline{)66}$	$33\overline{)99}$	$22\overline{)88}$	$21\overline{)84}$	$21\overline{)105}$
5.	$54\overline{)108}$	$52\overline{)104}$	$61\overline{)183}$	$82\overline{)328}$	$53\overline{)106}$
6.	$81\overline{)162}$	$71\overline{)355}$	$51\overline{)204}$	$41\overline{)164}$	$31\overline{)217}$
7.	$71\overline{)639}$	$81\overline{)243}$	$51\overline{)306}$	$61\overline{)366}$	$41\overline{)369}$
8.	$61\overline{)244}$	$91\overline{)546}$	$81\overline{)567}$	$41\overline{)287}$	$21\overline{)168}$
9.	$61\overline{)488}$	$51\overline{)459}$	$21\overline{)126}$	$51\overline{)255}$	$31\overline{)155}$
10.	$41\overline{)246}$	$91\overline{)273}$	$31\overline{)248}$	$41\overline{)328}$	$81\overline{)729}$

Divisions that Are a Little Harder

The first figure or the first two figures of a dividend may not contain the divisor an exact number of times.

1. Divide 92 tickets equally among 23 pupils.

$$\begin{array}{r} 4 \\ 23\overline{)92} \\ \underline{92} \\ 0 \end{array}$$

When dividing 9 by 2, the station number is 8, and the quotient is 4. Write **4** above the 2 of 92. Multiply 23 by 4. Write the product **92** under the dividend 92. There is no remainder.

2. Divide 504 tickets equally among 84 pupils.

$$\begin{array}{r} 6 \\ 84\overline{)504} \\ \underline{504} \\ 0 \end{array}$$

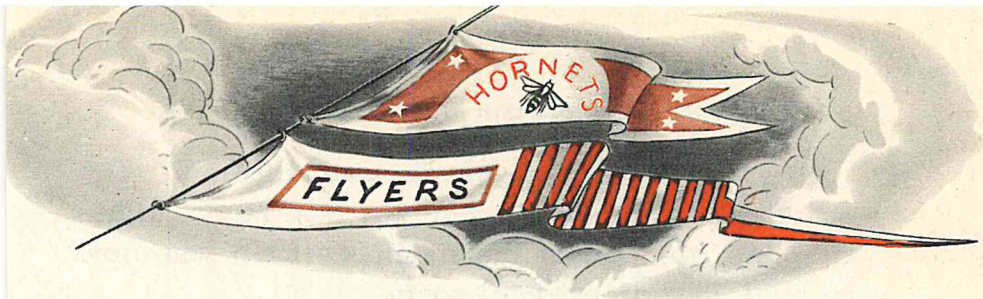
When dividing 50 by 8, the station number is 48, and the quotient is 6.

The pupil will tell how to finish the example.

Division Practice

Copy and divide:

	a	b	c	d	e
3.	$92\overline{)552}$	$52\overline{)312}$	$32\overline{)256}$	$82\overline{)656}$	$42\overline{)336}$
4.	$82\overline{)492}$	$52\overline{)260}$	$92\overline{)644}$	$62\overline{)434}$	$22\overline{)176}$
5.	$92\overline{)828}$	$52\overline{)364}$	$42\overline{)294}$	$72\overline{)432}$	$52\overline{)468}$
6.	$82\overline{)410}$	$42\overline{)252}$	$82\overline{)574}$	$42\overline{)378}$	$92\overline{)460}$
7.	$62\overline{)496}$	$32\overline{)192}$	$22\overline{)154}$	$82\overline{)738}$	$32\overline{)224}$
8.	$53\overline{)212}$	$43\overline{)387}$	$33\overline{)165}$	$63\overline{)378}$	$73\overline{)584}$
9.	$93\overline{)744}$	$33\overline{)264}$	$63\overline{)315}$	$73\overline{)511}$	$93\overline{)558}$



Pennant Races in Division

Divide the class into two teams. At the end of each race write the correct divisions on the blackboard. The pennant winner will be the team having the largest number of perfect papers.

Race I:

	a	b	c	d	e
1.	64)192	94)564	54)378	74)592	44)264
2.	94)470	54)270	44)308	64)576	74)296
3.	74)444	54)432	24)96	94)752	64)384
4.	44)220	74)518	64)320	44)396	54)216
5.	74)666	44)176	94)658	64)448	34)136

Race II:

1.	65)390	55)275	85)680	45)270	95)475
2.	35)105	75)600	65)195	55)495	95)665
3.	35)140	95)285	65)520	75)675	65)260
4.	85)340	95)570	45)315	55)385	75)225
5.	85)595	65)325	85)765	85)425	75)450

Watch the Scoreboard

After each section, check your answers. The scorekeeper will give your row as many tallies as there are perfect papers in it. Help your row to have the largest total score.

Section A

1.	$32\overline{)128}$	$72\overline{)216}$	$92\overline{)368}$	$42\overline{)168}$	$62\overline{)124}$
2.	$62\overline{)186}$	$82\overline{)164}$	$92\overline{)184}$	$82\overline{)246}$	$52\overline{)156}$
3.	$42\overline{)126}$	$72\overline{)144}$	$92\overline{)276}$	$72\overline{)288}$	$62\overline{)248}$
4.	$52\overline{)208}$	$91\overline{)364}$	$71\overline{)426}$	$41\overline{)205}$	$31\overline{)186}$
5.	$21\overline{)147}$	$81\overline{)486}$	$71\overline{)497}$	$51\overline{)357}$	$21\overline{)189}$

Section B

6.	$43\overline{)129}$	$83\overline{)166}$	$53\overline{)159}$	$73\overline{)219}$	$63\overline{)126}$
7.	$63\overline{)189}$	$83\overline{)249}$	$93\overline{)186}$	$93\overline{)279}$	$64\overline{)128}$
8.	$74\overline{)148}$	$84\overline{)168}$	$94\overline{)188}$	$91\overline{)182}$	$91\overline{)455}$
9.	$61\overline{)305}$	$91\overline{)637}$	$71\overline{)568}$	$81\overline{)648}$	$61\overline{)427}$

Section C

10.	$56\overline{)112}$	$66\overline{)198}$	$86\overline{)344}$	$76\overline{)532}$	$46\overline{)230}$
11.	$56\overline{)336}$	$76\overline{)608}$	$96\overline{)672}$	$46\overline{)184}$	$76\overline{)456}$
12.	$86\overline{)258}$	$96\overline{)480}$	$46\overline{)138}$	$36\overline{)108}$	$46\overline{)276}$
13.	$66\overline{)330}$	$56\overline{)392}$	$86\overline{)688}$	$66\overline{)594}$	$56\overline{)448}$

Section D

14.	$57\overline{)171}$	$77\overline{)462}$	$47\overline{)235}$	$67\overline{)469}$	$87\overline{)609}$
15.	$77\overline{)231}$	$47\overline{)188}$	$87\overline{)348}$	$77\overline{)616}$	$57\overline{)342}$
16.	$67\overline{)268}$	$97\overline{)485}$	$77\overline{)308}$	$57\overline{)399}$	$97\overline{)776}$
17.	$97\overline{)291}$	$67\overline{)335}$	$87\overline{)783}$	$87\overline{)522}$	$97\overline{)679}$
18.	$77\overline{)385}$	$47\overline{)141}$	$97\overline{)485}$	$67\overline{)402}$	$97\overline{)194}$

Section E

19. Mary made 288 pieces of fudge for a Christmas party. If she put 24 pieces in each bag, how many bags did she use?

20. The girls made towels as gifts. If it took 27 inches of material to make one towel, how many towels could they make from 324 inches of material?

21. The boys wove mats of string. If it took 96 feet of string for one mat, how many mats could they weave with 576 feet of string?

22. Ann popped corn. If she strung 35 pieces on each thread, how many threads could she string from 735 pieces?

23. Jack packed 25 pieces of candy in each small box. How many boxes did he need for 775 pieces of candy?

24. Miss Smith's class made address books. If it took 22 sheets of paper to make one book, how many books could they make from 748 sheets?

Two-Figure Divisors with a Remainder

1. Tom is making bookshelves to sell at a church fair. Each shelf is 21 inches long. How many shelves can be cut from a board 108 inches long, and how much will be left over?

Divide

$$21\overline{)108}\quad 5,\ 105,\ 3 \text{ remainder}$$

Check

21 divisor
x5 quotient
105
3 remainder
108 dividend

2. Tom has another board 150 inches long. How many shelves each 21 inches long can he cut from this board? How much will be left over?

Division Practice

Copy and divide. Show quotients and remainders. Check.

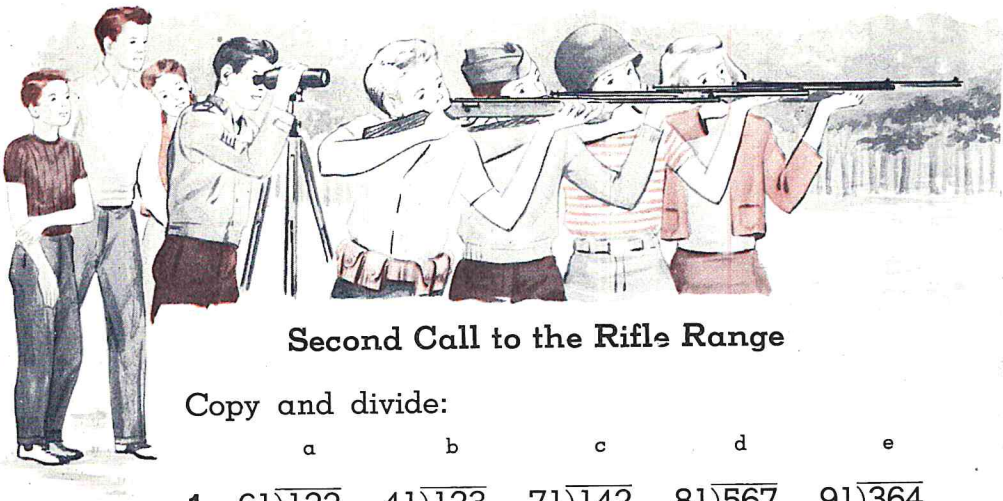
	a	b	c	d	e
3.	$22\overline{)156}$	$31\overline{)129}$	$32\overline{)198}$	$22\overline{)119}$	$63\overline{)319}$
4.	$34\overline{)138}$	$34\overline{)119}$	$31\overline{)220}$	$73\overline{)370}$	$95\overline{)580}$
5.	$75\overline{)620}$	$54\overline{)118}$	$92\overline{)400}$	$42\overline{)130}$	$52\overline{)320}$
6.	$73\overline{)667}$	$63\overline{)524}$	$72\overline{)589}$	$84\overline{)450}$	$73\overline{)300}$
7.	$84\overline{)592}$	$83\overline{)504}$	$75\overline{)455}$	$63\overline{)398}$	$94\overline{)492}$

First Call to the Rifle Range

Copy and divide:

	a	b	c	d	e
1.	$51\overline{)102}$	$71\overline{)284}$	$76\overline{)380}$	$36\overline{)144}$	$96\overline{)384}$
2.	$92\overline{)736}$	$72\overline{)360}$	$87\overline{)696}$	$77\overline{)539}$	$67\overline{)536}$
3.	$23\overline{)115}$	$33\overline{)198}$	$38\overline{)114}$	$78\overline{)546}$	$68\overline{)340}$
4.	$34\overline{)102}$	$74\overline{)222}$	$69\overline{)414}$	$99\overline{)396}$	$59\overline{)177}$
5.	$55\overline{)220}$	$75\overline{)525}$	$69\overline{)276}$	$99\overline{)792}$	$39\overline{)117}$
6.	$\frac{1}{2}$ of \$42	$\frac{1}{3}$ of \$60	$\frac{1}{4}$ of \$64	$\frac{1}{8}$ of \$32	$\frac{1}{4}$ of \$24
7.	$\frac{1}{5}$ of \$35	$\frac{1}{6}$ of \$24	$\frac{1}{8}$ of \$48	$\frac{1}{3}$ of \$27	$\frac{1}{3}$ of \$36

There are 35 answers for this page. Have captains put the correct answers on the blackboard. If you got 33 or more correct, you will find work on page 107. Others will answer the last call on page 106.



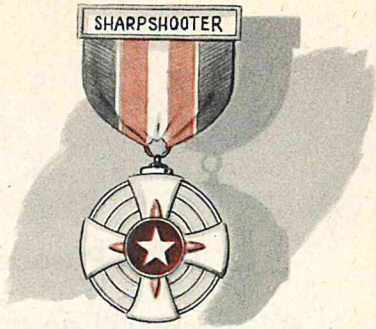
Second Call to the Rifle Range

Copy and divide:

	a	b	c	d	e
1.	$61\overline{)122}$	$41\overline{)123}$	$71\overline{)142}$	$81\overline{)567}$	$91\overline{)364}$
2.	$22\overline{)198}$	$32\overline{)288}$	$72\overline{)504}$	$62\overline{)310}$	$42\overline{)210}$
3.	$63\overline{)252}$	$73\overline{)365}$	$43\overline{)172}$	$33\overline{)132}$	$53\overline{)477}$
4.	$83\overline{)498}$	$43\overline{)215}$	$73\overline{)146}$	$43\overline{)344}$	$83\overline{)581}$
5.	$84\overline{)252}$	$64\overline{)256}$	$64\overline{)512}$	$34\overline{)204}$	$44\overline{)352}$
6.	$84\overline{)420}$	$34\overline{)170}$	$54\overline{)486}$	$84\overline{)756}$	$54\overline{)162}$
7.	$55\overline{)330}$	$65\overline{)455}$	$95\overline{)380}$	$75\overline{)300}$	$95\overline{)760}$
8.	$66\overline{)264}$	$86\overline{)430}$	$56\overline{)280}$	$76\overline{)228}$	$96\overline{)576}$
9.	$87\overline{)261}$	$57\overline{)228}$	$87\overline{)435}$	$77\overline{)154}$	$97\overline{)582}$
10.	$88\overline{)616}$	$58\overline{)232}$	$69\overline{)345}$	$89\overline{)356}$	$98\overline{)490}$

Choose captains to put answers on the blackboard. Check your papers. The perfect score is 50.

Targets for Sharpshooters



Here are some special targets for crack shots.

To divide the short way, you divide and write the quotient as in the long way. In the short way, though, you do all the other steps in your mind and do not write them.

Study the examples below. These show all that is written when dividing the short way.

162	122 r3	39	44 r2
6)972	7)857	7)273	9)398

Two sharpshooters will work together on the divisions below. Let Sharpshooter Number One do the first three rows the short way while Sharpshooter Number Two checks by doing them the long way. Change about for rows 4-6.

	a	b	c	d	e
1.	4)328	5)395	8)656	7)539	9)846
2.	6)354	2)228	2)136	8)736	5)280
3.	7)427	8)368	4)224	9)558	3)237
4.	6)576	9)769	7)567	8)514	4)346
5.	9)378	7)455	8)664	6)972	4)345
6.	5)4125	6)4932	8)5272	4)1728	3)1695

Challenge another sharpshooter to work with you on page 97, 98, 99, 100, 101, or 102.

Dress Parade—Review of Unit 4

All pupils will do this page.

Divide and check:

	a	b	c	d	e
1.	7)266	6)930	9)387	8)936	5)767
2.	34)238	94)846	55)440	45)180	66)396
3.	56)168	73)657	86)774	75)375	74)370
4.	96)192	93)837	76)684	94)282	35)175
5.	87)174	57)285	79)474	99)198	78)312

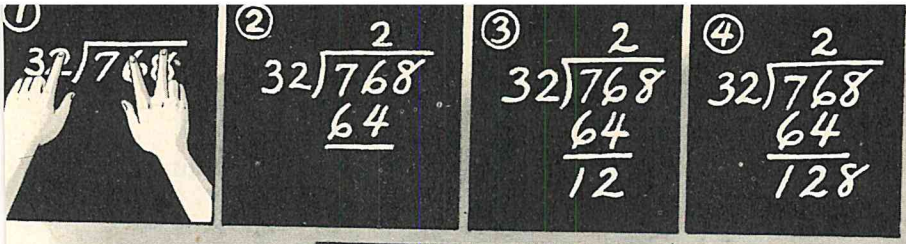
6. Elmer made these grades: arithmetic 86, geography 79, reading 91, spelling 80. What was his average grade?

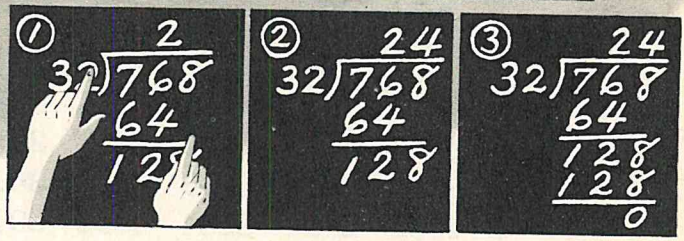
7. Eight children weigh a total of 616 pounds. What is their average weight?

8. Jane paid a total of $1.92 in club dues in 8 weeks. What was the average per week?

9. At the rate of 45 miles an hour, how many hours will it take one to drive 135 miles?

10. Miss Brown bought 16 yards (576 inches) of ribbon. If the ribbon is divided equally among 64 pupils, how many inches will each pupil get?





More About Long Division

Divide 768 books equally among 32 classes. Check.

Use these four steps to find each quotient figure.

First Step: **Divide,** $7 \div 3$. Write quotient figure **2** above 6 of 76.

Second Step: **Multiply,** $2 \times 32 = 64$. Write **64** under 76.

Third Step: **Subtract,** $76 - 64 = 12$.

Fourth Step: **Bring down 8** to make new dividend **128**.

First Step Repeated: **Divide,** $12 \div 3$. Write quotient **4** above 8.

Second Step Repeated: **Multiply,** $4 \times 32 = 128$. Write **128** under dividend 128.

Third Step Repeated: **Subtract,** $128 - 128 = 0$.

There is no remainder, and no figure to bring down. The example is finished.

Division

```
  24
32)768
  64
 128
 128
   0
```

Check

```
 32
x24
128
 64
768
```

Practice in Dividing

Divide each number in a row by the number in parenthesis at the right of the row. Check each division.

	a	b	c	d	e	f	
1.	1092	735	1365	1785	1953	1575	(21)
2.	1395	2263	2542	2883	2635	2387	(31)
3.	3116	1845	3813	1968	3485	3362	(41)
4.	1632	2754	3264	4692	3978	2448	(51)
5.	2623	2745	5185	5612	3355	5368	(61)
6.	3976	5893	6532	4473	5538	3479	(71)
7.	6075	4617	7938	3888	6723	5346	(81)
8.	5096	7098	8918	5824	4095	7462	(91)
9.	1584	748	1386	1188	579	968	(22)
10.	2368	1696	2688	2976	2016	1760	(32)
11.	3150	1974	3948	3486	2772	2184	(42)
12.	3484	4472	2808	4888	3796	1976	(52)
13.	4030	5332	5952	3472	4588	2666	(62)
14.	6984	3384	4032	5544	6192	6696	(72)
15.	7544	6642	6232	4592	3444	5166	(82)
16.	8924	7084	7452	4048	5796	7636	(92)
17.	368	759	1173	989	966	345	(23)
18.	2673	858	2079	2376	1749	1386	(33)
19.	3182	3569	3956	1978	2365	2666	(43)
20.	4982	3975	4452	2915	3339	4346	(53)
21.	4032	4788	5292	5985	2835	3213	(63)
22.	6132	6935	5548	4161	2993	4599	(73)
23.	7885	6308	6972	5229	4731	3403	(83)
24.	8742	6882	5115	7998	5859	3069	(93)

A Division Contest

Each row will choose someone who divides well for captain. After each six divisions the captain will put the correct divisions on the blackboard. See which row of pupils will have the largest number of perfect papers each time.

1.	1768	2074	1462	1088	1734	1428	(34)
2.	3564	4004	3168	2376	1892	1584	(44)
3.	4968	4482	3456	3834	2322	2970	(54)
4.	3456	4672	5248	5824	3968	1728	(64)
5.	4816	5476	6142	6808	3034	2738	(74)
6.	5544	3880	2352	5964	7980	6972	(84)
7.	5358	6016	6674	7708	4042	2632	(94)
8.	275	525	775	575	300	825	(25)
9.	1785	1575	1225	735	1470	840	(35)
10.	2790	1935	2385	1575	1170	765	(45)
11.	2970	3965	2475	3465	2805	935	(55)
12.	4745	1755	2925	4030	5265	5980	(65)
13.	4575	1334	2700	6225	3375	6975	(75)
14.	3655	5525	7055	7990	4675	1955	(85)
15.	6935	3515	4180	5225	8645	7790	(95)
16.	286	546	312	572	364	390	(26)
17.	1476	1152	864	576	1188	540	(36)
18.	1978	2346	1150	1472	2392	736	(46)

A Flower Grower Uses 2-Figure Divisors

1. Mr. Green has cut 535 roses. He will tie them in bunches with 24 roses in each bunch. How many bunches will he have? How many roses will be left over?

```
   22 bunches
24)535
   48
   55
   48
    7 left over
```

Check

```
  24
 x22
  48
 48
528
  7
535
```

2. Mr. Green puts 36 small potted plants in a tray. How many trays will he need for 1116 plants? Will there be any plants left over?

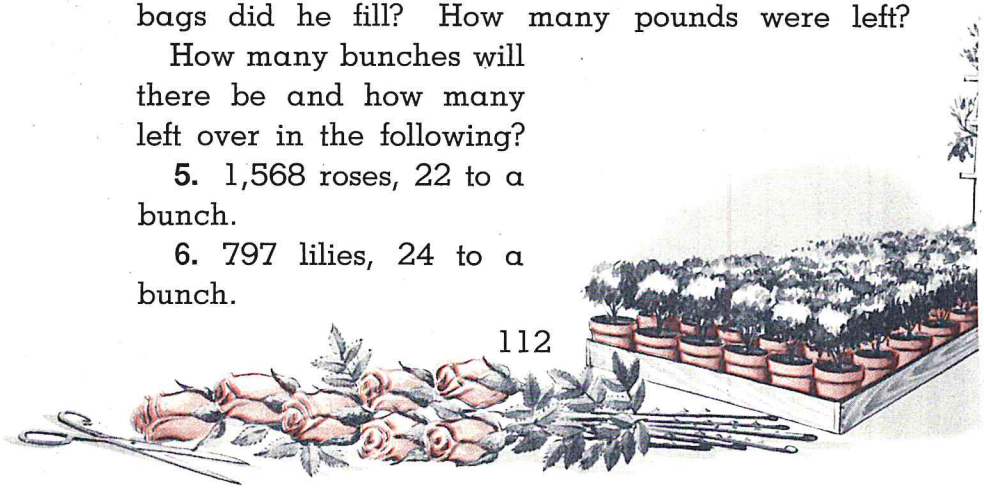
3. He stored 1,445 pounds of plant food in 20-pound bags. How many bags did he need to use? Was the last bag completely full?

4. He stored 4,840 pounds of another kind of plant food in 75-pound bags. How many full bags did he fill? How many pounds were left?

How many bunches will there be and how many left over in the following?

5. 1,568 roses, 22 to a bunch.

6. 797 lilies, 24 to a bunch.



A Farmer Needs to Divide

1. This farmer has 1,155 pounds of potatoes. He will put them in bags that hold 30 pounds each. How many full bags will he have? How many pounds of potatoes will be left over?

2. Last week he gathered 556 extra large onions. He will put them in boxes that hold 24 onions each. How many full boxes will he have? How many onions will be left over?

3. He has 775 tomato plants which he will put in rows, with 32 plants to a row. How many full rows will he have? How many plants will be left over?

4. Last month (31 days), he gathered 868 eggs. What was the average number of eggs per day?

5. He bought 5,976 pounds of oats. If he feeds his horses at the rate of 72 pounds a day, how many days will the oats last? Will there be any left over?

Practice in Dividing

Divide each number in a row by the number in parenthesis at the right of the row. Check. Mark papers after each row.

	a	b	c	d	e	f	
1.	6232	5396	4104	1976	3116	4864	(76)
2.	6966	7052	3956	5332	4558	2666	(86)
3.	7968	5376	6048	7104	8832	4224	(96)
4.	518	888	1184	1184	814	1147	(37)
5.	705	1175	1551	1128	1974	1927	(47)
6.	969	1425	2451	2907	1482	1881	(57)
7.	1742	2345	2747	3484	4154	1139	(67)
8.	6237	5544	4851	4158	2541	1848	(77)
9.	1479	2358	5568	6281	7134	2175	(87)
10.	8051	6208	5141	4268	2037	1746	(97)
11.	672	1056	1584	1968	1104	1536	(48)
12.	928	1334	1972	2958	2436	1798	(58)
13.	1156	1632	3536	4148	2380	2992	(68)
14.	1326	3354	4836	5538	4056	2730	(78)
15.	2288	3784	4576	6248	5544	3168	(88)
16.	7154	5292	7938	6174	4312	2058	(98)
17.	578	1127	1568	686	1519	637	(49)
18.	885	2419	1947	1357	2478	826	(59)
19.	1104	1725	2346	2967	3588	1587	(69)
20.	1343	4187	3476	2607	4839	1975	(79)
21.	1521	2314	3026	4737	5429	3738	(89)
22.	1782	4356	5148	6039	7128	2277	(99)

Dividing Named Numbers

1. Mr. Jones paid $1,768 for a farm of 34 acres. How much did each acre of land cost?

$$\begin{array}{r} \$52 \\ 34\overline{)\$1{,}768} \\ 170 \\ \hline 68 \\ 68 \\ \hline \end{array}$$

2. He bought a tractor for $768. He agreed to pay for it in 24 equal payments. How many dollars will he pay each time?

3. He bought a used truck for $945. If he paid for it in 21 equal payments, how many dollars did he pay each time?

4. Mr. Jones paid $935 for cows. If the cows cost $85 each, how many cows did he buy?

5. Mr. Jones paid $1,944 for another farm. If the land cost $54 an acre, how many acres were in the farm?

6. He hauled 4,920 pounds of wheat to town in his truck. Wheat weighs 60 pounds to the bushel. How many bushels of wheat did Mr. Jones take to town?

7. The Jones family went on a trip of 168 miles. If Mr. Jones can drive 21 miles on one gallon of gasoline, how many gallons of gasoline did it take to make the trip?

8. If Mr. Jones drove at an average speed of 42 miles an hour, how long did it take him to make the trip?

9. There are 30 dozen eggs in a case. How many cases can Mr. Jones fill with 720 dozen eggs?

Learning More About Divisors

Until now, dividing with 2-figure divisors has been easy. You always found the quotient figure by dividing the first figure or the first two figures of the dividend by the first figure of the divisor. The quotient figure you found in this way was always right.

Divide and check:

1. $54\overline{)756}$ $61\overline{)4392}$ $76\overline{)1064}$ $95\overline{)855}$ $83\overline{)581}$

But now you must learn that in some divisions the rule you have used for finding the quotient figure will not work.

2. Divide 161 by 23.

It looks as if the quotient figure is $16 \div 2$, or 8. But 8 is too large, for 8×23 is 184, and 184 is larger than 161.

Too Large	Correct
8	7
$23\overline{)161}$	$23\overline{)161}$
184	161

Since 8 is too large, try the next smaller number, 7. The quotient figure 7 is correct, for 7×23 is 161.

Copy and divide. Check each answer.

	a	b	c	d	e
3.	$23\overline{)184}$	$24\overline{)120}$	$25\overline{)125}$	$35\overline{)280}$	$36\overline{)216}$
4.	$26\overline{)130}$	$47\overline{)282}$	$37\overline{)296}$	$27\overline{)108}$	$28\overline{)868}$
5.	$38\overline{)152}$	$29\overline{)116}$	$39\overline{)195}$	$59\overline{)354}$	$79\overline{)632}$
6.	$24\overline{)144}$	$25\overline{)100}$	$35\overline{)210}$	$36\overline{)180}$	$46\overline{)322}$
7.	$26\overline{)104}$	$36\overline{)288}$	$37\overline{)222}$	$28\overline{)112}$	$49\overline{)343}$

More About Quotient Figures

Too Large

$$27\overline{)162}\quad 8,\ 216$$

Too Large

$$27\overline{)162}\quad 7,\ 189$$

Correct

$$27\overline{)162}\quad 6,\ 162$$

You divide the first figure or the first two figures of the dividend by the first figure of the divisor to find a quotient figure. When you test it, you find that the quotient figure is too large. Then you take the next smaller figure for a quotient. If you find that it is too large, you must try the next smaller number.

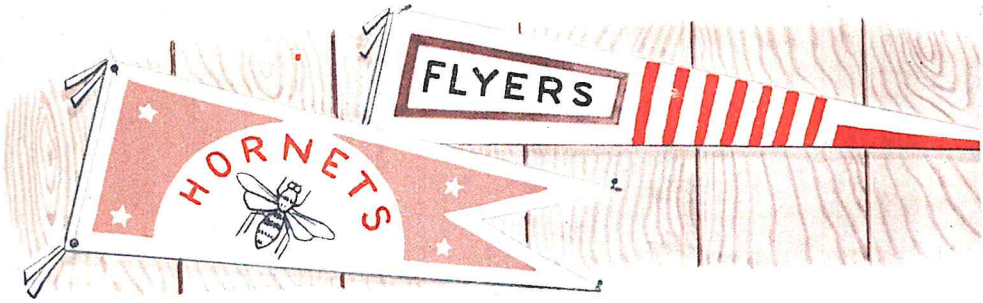
Study the example at the right.

1. Why would one choose 8 as quotient figure?
2. How can one know that 8 is too large?
3. Why would one choose 7 as quotient figure?
4. How can one know that 7 is too large?
5. Why would one choose 6 as quotient figure?
6. How can one know that 6 is right?

The product of the quotient figure and the divisor must not be greater than the dividend. Watch! Some of the quotient figures found below do not need to be made smaller.

Copy and divide. Check.

	a	b	c	d	e
7.	$24\overline{)192}$	$25\overline{)150}$	$35\overline{)245}$	$45\overline{)360}$	$26\overline{)182}$
8.	$46\overline{)368}$	$25\overline{)175}$	$27\overline{)162}$	$67\overline{)536}$	$37\overline{)259}$
9.	$47\overline{)329}$	$57\overline{)456}$	$68\overline{)476}$	$27\overline{)189}$	$47\overline{)376}$



Pennant Races in Division

Divide the class into two teams. After each race write the correct divisions on the blackboard. Did the Hornets or the Flyers win?

		a	b	c	d	e
R	1.	$27\overline{)54}$	$24\overline{)72}$	$25\overline{)75}$	$35\overline{)70}$	$75\overline{)150}$
A	2.	$45\overline{)90}$	$26\overline{)52}$	$85\overline{)170}$	$26\overline{)78}$	$37\overline{)74}$
C	3.	$25\overline{)50}$	$85\overline{)510}$	$55\overline{)110}$	$65\overline{)130}$	$85\overline{)255}$
E	4.	$55\overline{)165}$	$76\overline{)152}$	$57\overline{)114}$	$66\overline{)132}$	$36\overline{)72}$
I	5.	$46\overline{)92}$	$47\overline{)94}$	$98\overline{)196}$	$78\overline{)156}$	$86\overline{)172}$
R	1.	$67\overline{)134}$	$88\overline{)176}$	$49\overline{)98}$	$58\overline{)116}$	$69\overline{)138}$
A	2.	$48\overline{)96}$	$29\overline{)58}$	$28\overline{)56}$	$39\overline{)78}$	$38\overline{)76}$
C	3.	$59\overline{)118}$	$99\overline{)297}$	$79\overline{)237}$	$89\overline{)445}$	$79\overline{)158}$
E	4.	$59\overline{)295}$	$89\overline{)534}$	$99\overline{)594}$	$99\overline{)891}$	$93\overline{)651}$
II	5.	$97\overline{)873}$	$77\overline{)693}$	$88\overline{)792}$	$98\overline{)784}$	$98\overline{)392}$

		a	b	c	d	e
R	1.	48)192	78)234	88)528	58)174	68)408
A	2.	98)294	88)352	58)290	78)624	78)390
C	3.	68)272	88)704	98)686	68)476	98)882
E	4.	79)316	99)495	49)147	89)178	99)792
III	5.	69)207	89)712	79)553	89)267	59)236

R	1.	21)861	21)273	31)992	31)403	51)612
A	2.	42)504	32)416	22)286	22)264	32)384
C	3.	63)756	73)949	83)996	43)516	43)774
E	4.	74)962	54)756	34)578	44)704	24)336
IV	5.	35)525 15	65)845 13	75)975 13	45)675 15	55)935

R	1.	24)168	26)156	36)252	27)135	39)159
A	2.	38)190	29)87	39)156	49)294	26)158
C	3.	69)552	59)413	48)384	29)145	36)293
E	4.	39)234	59)295	59)472	39)273	25)106
V	5.	69)483	89)623	49)245	63)567	29)124

More Help in Finding Quotient Figures

Study the example at the right.

Why might one choose 1 as the quotient figure to be written above 4 of 34?

How can one know that this is not right?

Why might one choose 9 as the quotient figure to be written above 2 of 342?

If 10 is too large for the quotient, try 9.

Too Large

$$\begin{array}{r} 1 \\ 38\overline{)342} \\ 38 \\ \hline \end{array}$$

Correct

$$\begin{array}{r} 9 \\ 38\overline{)342} \\ 342 \\ \hline \end{array}$$

Copy and divide. Check.

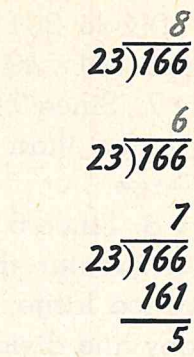
	a	b	c	d	e
1.	$23\overline{)207}$	$25\overline{)200}$	$25\overline{)225}$	$35\overline{)315}$	$45\overline{)405}$
2.	$26\overline{)208}$	$26\overline{)234}$	$36\overline{)324}$	$46\overline{)414}$	$56\overline{)504}$
3.	$27\overline{)216}$	$27\overline{)243}$	$37\overline{)333}$	$47\overline{)423}$	$57\overline{)513}$
4.	$67\overline{)603}$	$28\overline{)224}$	$28\overline{)252}$	$38\overline{)304}$	$38\overline{)342}$
5.	$48\overline{)432}$	$58\overline{)522}$	$68\overline{)612}$	$78\overline{)702}$	$29\overline{)203}$
6.	$29\overline{)232}$	$29\overline{)261}$	$39\overline{)312}$	$39\overline{)351}$	$49\overline{)441}$
7.	$59\overline{)531}$	$69\overline{)621}$	$79\overline{)711}$	$89\overline{)801}$	$24\overline{)216}$

8. Farmer Smith paid \$612 for 68 pigs. If the price of all the pigs was the same, how much did one pig cost? Is the answer named dollars or pigs?

Thinking Away the Quotient Difficulties

One can save himself a lot of trouble and a lot of writing if he learns to test quotient figures in his mind. He will not write a quotient figure until he has tested it and knows that it is right.

The ghost writing in the example shows what goes on in your mind.



Copy and divide, and show with ghost writing what you think as you test each quotient figure.

A. 28)112 B. 27)162 C. 26)182

D. 28)115 E. 27)170 F. 26)193

Copy and divide. Test each quotient figure before you write it, but do not write what goes on in your mind as you test. Watch! Some of the quotient figures when tested are right.

	a	b	c	d	e
1.	98)200	23)189	26)135	69)211	38)159
2.	24)153	26)111	24)172	29)89	85)512

A Little Secret: Some pupils find it too hard, in the beginning, to test quotient figures in their minds. It is easier for them to write what they think. If you are sure you are like this, and not just lazy in your mind, you may write what you think in testing whether a quotient figure is right. Later on, as you have more practice, you will test without this extra writing.

More Practice in Testing Quotient Figures

1. Divide 301 by 49.

Think **30**1 ÷ **4**9 = ?

Try 7. Since 7 × 49 or 343 is greater than 301, 7 is too large.

Try 6. Since 6 × 49 or 294 is not greater than 301, 6 is not too large.

$$\begin{array}{r} 6 \\ 49\overline{)301} \\ 294 \\ \hline 7 \end{array}$$

Check

$$\begin{array}{r} 49 \\ \times 6 \\ \hline 294 \\ 7 \\ \hline 301 \end{array}$$

Copy and divide. Test each quotient figure. Some you try will be right, and some may be 1 or 2 too large.

	a	b	c	d	e
2.	49)310	35)294	27)111	59)363	36)185
3.	28)118	27)139	69)563	28)86	36)234
4.	79)645	46)325	49)353	38)197	59)442
5.	24)195	68)478	46)375	47)333	28)145
6.	28)175	37)191	48)392	39)279	25)164
7.	25)181	57)464	38)232	48)245	28)212
8.	29)153	69)498	89)633	39)243	38)271
9.	58)411	48)343	68)487	27)169	35)253
10.	59)299	88)183	57)124	45)365	67)543
11.	27)193	58)473	29)182	48)293	59)312

Remembering the Steps in Long Division

These are all the steps you need if the quotient figure is right.

Step 1. **Divide** and write the quotient figure. (19 ÷ 4. Write the quotient figure 4 above 3 of 193.)

Step 2. **Multiply** and write the product. (4 times 46 = 184. Write 184 under 193.)

```
   42
46)1932
  184
  ---
   92
   92
  ---
```

Check

```
  46
x 42
  --
  92
 184
1932
```

Step 3. **Subtract** and write the remainder. (184 from 193 leaves 9. Write 9.)

Step 4. **Bring down** the next dividend figure. (Bring 2 down and write beside 9 to make 92.)

Repeat steps 1, 2, 3, and 4 until the division is finished.

When you are not sure a quotient figure is right, another step is needed. *You must compare the product found in step 2 with the dividend.* If this product is greater than the dividend, the quotient figure used is too large. You should learn to do this "compare" step in your mind.

This "compare" step tells you either (a) the quotient figure you are using is right, or (b) the quotient figure you are using is too large. *If the quotient figure you are using is too large, try the next smaller figure, and continue trying the next smaller figure until you find the quotient figure that is right.*

Practice in Using the Compare Step

Copy and divide. Check. Mark papers after each row.

1. $23\overline{)1886}$ $24\overline{)1944}$ $26\overline{)1612}$ $36\overline{)2628}$ $27\overline{)1944}$

2. $23\overline{)1679}$ $34\overline{)2788}$ $26\overline{)1898}$ $46\overline{)3358}$ $37\overline{)2405}$

3. $24\overline{)1296}$ $38\overline{)2394}$ $26\overline{)1326}$ $46\overline{)3772}$ $47\overline{)3431}$

4. $24\overline{)1512}$ $34\overline{)2958}$ $36\overline{)1872}$ $46\overline{)3864}$ $57\overline{)4631}$

5. $24\overline{)1728}$ $26\overline{)1092}$ $36\overline{)2196}$ $27\overline{)1701}$ $28\overline{)1736}$

6. $23\overline{)1311}$ $23\overline{)1104}$ $33\overline{)1947}$ $43\overline{)2881}$ $53\overline{)4134}$

7. $38\overline{)2052}$ $38\overline{)3306}$ $48\overline{)3984}$ $58\overline{)4234}$ $68\overline{)5644}$

8. $88\overline{)7656}$ $27\overline{)1674}$ $37\overline{)2701}$ $47\overline{)3854}$ $57\overline{)4788}$

9. $29\overline{)1566}$ $39\overline{)2886}$ $49\overline{)3087}$ $59\overline{)4484}$ $69\overline{)5037}$

10. $79\overline{)6557}$ $28\overline{)1204}$ $48\overline{)2208}$ $58\overline{)4756}$ $24\overline{)1824}$

11. $53\overline{)3053}$ $62\overline{)3032}$ $71\overline{)2981}$ $44\overline{)1692}$ $73\overline{)6422}$

12. $65\overline{)2539}$ $63\overline{)4865}$ $32\overline{)2876}$ $74\overline{)5024}$ $43\overline{)2438}$

13. $54\overline{)1266}$ $72\overline{)3614}$ $51\overline{)1581}$ $35\overline{)2482}$ $63\overline{)3676}$

What Must I Do?

Must I add, subtract, multiply, or divide to find the right answer?

1. I know the number of boys and I know the number of girls in my class. How do I find the total number of boys and girls?

2. When I buy several things at the store, what should I do to find the total bill?

3. What do I do to find how much change I should get when I pay a bill?

4. If Mother wants to give each member of the family the same number of cookies and she knows how many cookies she has in all, what will she do to find how many cookies each will get?

5. When Mother knows the cost of 1 handkerchief, how can she find the cost of several handkerchiefs?

6. The grocer tells Mother the price of a dozen oranges. How can she find the cost of 1 orange?

7. If you know how many pages are in a book and know how many pages you can read in an hour, how do you find how many hours it will take to read the book?

8. If Father wants to know how much is left after he pays a certain bill, what must he do?

9. A grocer received a shipment of oranges. He had to throw out some boxes because the oranges were spoiled. How can he find how many boxes of good oranges he has?

Mixed Review

Which can you do best: add, subtract, multiply, or divide? Here is a chance to find out. Mark your paper after each section.

Section A. Addition

Write the sums on folded paper:

1.	2.	3.	4.	5.
	194	2345	24	$215.02
275	9	840	136	65.20
475	285	43	23	.96
				4.17

Write neatly in straight columns and add.

6. 87, 23, 18, 38

7. 423, 56, 9, 45

8. $45.89, $23.15, $0.50

9. $2.86, $0.56, $1.28

Section B. Subtraction

Write the remainders on folded paper:

1.	2.	3.	4.	5.
385	1894	1004	$214.67	$1.20
45	583	892	41.20	.09

Write neatly in straight columns and subtract.

6. 325 from 1000

7. 23 from 3092

8. $4.23 from $100.00

9. $0.25 from $1.41

Section C. Multiplication

Copy and multiply:

1.	2.	3.	4.	5.
47	389	893	8927	10009
36	5	937	143	89

6. 859×40

7. 714×600

8. 819×1735

9. 645×7859

Section D. Division

Copy and divide. Check by multiplying.

1. $9\overline{)27}$ **2.** $8\overline{)368}$ **3.** $7\overline{)369}$ **4.** $4\overline{)1272}$ **5.** $6\overline{)5681}$

6. $840 \div 21$ **8.** $5525 \div 25$

7. $779 \div 24$ **9.** $3198 \div 26$

Section E. Problems

1. Mr. Hale drove 243 miles at an average speed of 27 miles an hour. How many hours did it take him to make the trip? Is the answer named miles or hours?

2. If Mr. Cole packs 36 apples in a box, how many boxes will it take to pack 324 apples? Is the answer named apples or boxes?

3. Last year 576 bushels of wheat were raised on the Jones farm. This was an average of 24 bushels to the acre. How many acres were planted in wheat?

4. There are 60 pounds of white clover in a bushel. It takes 9 pounds of white clover seed to sow an acre. How many bushels of white clover seed are needed to sow 20 acres?

5. Bob picked 2,400 quarts of cherries. If he packed them in crates with 72 quarts to a crate, how many full crates were there? How many quarts were left over?

6. He picked 2,880 quarts of berries. If he packed them in crates with 64 quarts to a crate, how many full crates were there? How many quarts were left over?

Dividing by 11, 12, and the "Teens"

When a 2-figure divisor begins with 1, it may be a little more work to find the correct quotient figures.

1. Divide 396 by 17.

To find first quotient figure, think $396 \div 17 = ?$

Try 3. Since 3×17 or 51 is greater than 39, 3 is too large.

Try 2. Since 2×17 or 34 is not greater than 39, 2 is the correct quotient figure.

To find the second quotient figure, think $56 \div 17 = ?$

Try 5. 5×17 or 85 is too large.

Try 4. 4×17 or 68 is too large.

Try 3. 3×17 or 51. Then, 3 is the correct quotient figure.

$$\begin{array}{r} 23 \\ 17\overline{)396} \\ 34 \\ \hline 56 \\ 51 \\ \hline 5 \end{array}$$

Divide each number in a row by the number in parenthesis at the end of the row.

	a	b	c	d	e	f	
2.	352	286	429	451	693	132	(11)
3.	468	396	576	732	912	204	(12)
4.	546	793	884	988	676	247	(13)
5.	728	644	784	952	588	378	(14)
6.	645	735	810	615	525	255	(15)
7.	432	624	784	368	416	928	(16)
8.	816	612	425	629	833	782	(17)
9.	396	828	972	504	1476	1188	(18)
10.	1197	646	1273	741	1235	494	(19)

Getting the Right Quotient Figure Faster

1. Divide 539 by 19.

For the first quotient figure, think of 5 or 4 or 3. Each of these seems to be too large. Try 2. Since the product 38 is not greater than 53, the quotient figure 2 is not too large.

$$\begin{array}{r} 2 \\ 19\overline{)539} \\ 38 \\ \hline 15 \end{array} \qquad \begin{array}{r} 28 \\ 19\overline{)539} \\ 38 \\ \hline 159 \\ 152 \\ \hline 7 \end{array}$$

Since the remainder 15 is less than the divisor 19, the quotient figure 2 is not too small.

2. Divide 539 by 17.

For the first quotient figure, think of 5 or 4 or 3. Each seems to be too large. Try 2. Since the product 34 is not greater than 53, the figure 2 is not too large.

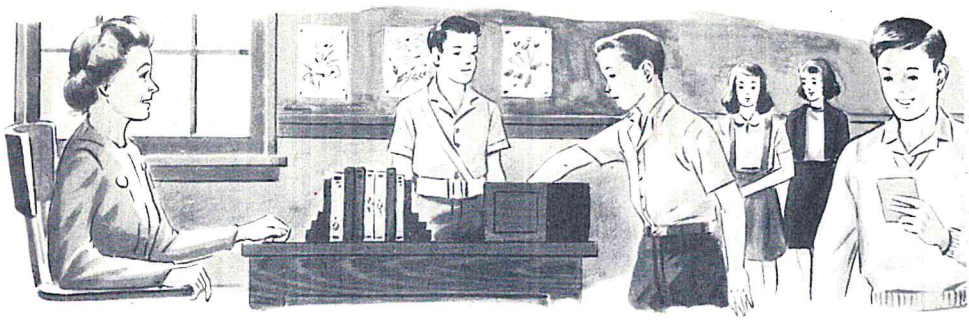
$$\begin{array}{r} 2 \\ 17\overline{)539} \\ 34 \\ \hline 19 \end{array} \qquad \begin{array}{r} 31 \\ 17\overline{)539} \\ 51 \\ \hline 29 \\ 17 \\ \hline 12 \end{array}$$

The remainder 19 is greater than the divisor 17. This shows that the quotient figure 2 is too small.

Comparing the remainder with the divisor will help you to find whether the quotient figure is **too small.** This is the **second "compare" step.**

If the first quotient figure is much too large, you can get the right quotient figure faster by skipping over some numbers. If you skip too many, the quotient figure will be too small.

3. Do divisions on page 128 again. Try to get the quotient figures faster.



Playing Traffic "Cop"

Your teacher is the judge. Choose a traffic "cop." He will write the numbers 1 to 28 on small squares of paper and place all the papers in a box on the teacher's desk.

When called by the cop, the pupil draws a number from the box. If he can answer the question or work the problem that has that number, the case is dismissed. If he cannot, he is given a ticket and charged with blocking traffic. The cop sends him to the judge. (If a pupil draws a 2-figure number and the sum of the two figures is 5, he can ask the cop to answer the question or work the problem.)

The judge fines those sent to him. The fine is to do the back work so the pupil will not block traffic again.

The numbers in parenthesis give the pages where one may read the law. Those who know the law and keep it will not get traffic tickets.

1. How do you find the quotient figure to use first? (98)

2. How can you tell whether a quotient figure is too large? (116, 117, 120)

3. How can you tell whether a quotient figure is too small? (129)

4. What two numbers should you compare before you subtract? Why do you compare these numbers? (123)

5. What two numbers should you compare after you subtract? Why do you compare these numbers? (129)

6. What is meant by "bring down?" (109)

7. Where do you write the first quotient figure? (109)

8. If the quotient figure you try is too large, what do you do? (116, 117, 120)

9. How do you check division when there is no remainder? (69, 109)

10. How do you check division when there is a remainder? (91, 112)

11. How are the station numbers for 30 like and how are they unlike the station numbers for 3? (96)

12. Name the four main steps in division in order. (109)

Copy and divide:

13. $78\overline{)390}$ **17.** $48\overline{)1968}$ **21.** $58\overline{)4756}$ **25.** $11\overline{)286}$

14. $67\overline{)469}$ **18.** $98\overline{)4312}$ **22.** $39\overline{)2886}$ **26.** $12\overline{)735}$

15. $89\overline{)712}$ **19.** $77\overline{)4158}$ **23.** $72\overline{)3614}$ **27.** $13\overline{)681}$

16. $52\overline{)312}$ **20.** $65\overline{)5265}$ **24.** $56\overline{)4592}$ **28.** $14\overline{)793}$

Speeding Our Division

Choose players for Team A and Team B. Try to be the first one to finish. After each race exchange papers and check by multiplying. The team with the largest number of perfect papers wins!

Race I

	Team A	Team B
1.	$6\overline{)216}$	$7\overline{)343}$
2.	$9\overline{)729}$	$8\overline{)656}$
3.	$7\overline{)243}$	$6\overline{)316}$
4.	$8\overline{)705}$	$9\overline{)883}$
5.	$4\overline{)844}$	$5\overline{)635}$
6.	$3\overline{)972}$	$4\overline{)972}$

Race II

	Team A	Team B
1.	$30\overline{)720}$	$40\overline{)720}$
2.	$70\overline{)1540}$	$80\overline{)2320}$
3.	$50\overline{)2765}$	$60\overline{)3942}$
4.	$80\overline{)5760}$	$70\overline{)3360}$
5.	$40\overline{)969}$	$30\overline{)969}$
6.	$60\overline{)1345}$	$50\overline{)1582}$

Race III

1.	$61\overline{)427}$	$61\overline{)549}$
2.	$82\overline{)328}$	$53\overline{)424}$
3.	$77\overline{)462}$	$47\overline{)188}$
4.	$27\overline{)243}$	$45\overline{)405}$
5.	$48\overline{)384}$	$39\overline{)273}$
6.	$92\overline{)644}$	$74\overline{)444}$

Race IV

1.	$41\overline{)2665}$	$41\overline{)3034}$
2.	$62\overline{)2232}$	$62\overline{)4712}$
3.	$53\overline{)2491}$	$53\overline{)3869}$
4.	$34\overline{)2278}$	$34\overline{)2482}$
5.	$76\overline{)4256}$	$76\overline{)5472}$
6.	$87\overline{)3915}$	$87\overline{)4524}$

Race V

1.	$28\overline{)1876}$	$28\overline{)2128}$
2.	$39\overline{)3276}$	$39\overline{)2535}$
3.	$45\overline{)3015}$	$45\overline{)3735}$
4.	$57\overline{)3819}$	$57\overline{)3306}$
5.	$66\overline{)4422}$	$66\overline{)3894}$
6.	$94\overline{)6016}$	$94\overline{)5358}$

Race VI

1.	$12\overline{)648}$	$12\overline{)804}$
2.	$13\overline{)988}$	$13\overline{)845}$
3.	$14\overline{)798}$	$14\overline{)896}$
4.	$16\overline{)900}$	$16\overline{)700}$
5.	$17\overline{)731}$	$17\overline{)918}$
6.	$18\overline{)1404}$	$19\overline{)1406}$

Race VII

1.	$38\overline{)3154}$	$67\overline{)5561}$
2.	$57\overline{)4731}$	$79\overline{)7189}$
3.	$26\overline{)2522}$	$88\overline{)7128}$
4.	$59\overline{)4779}$	$86\overline{)2666}$
5.	$36\overline{)2916}$	$27\overline{)1917}$

Race VIII

1.	$58\overline{)4756}$	$68\overline{)6226}$
2.	$36\overline{)2736}$	$39\overline{)3588}$
3.	$76\overline{)3952}$	$47\overline{)2961}$
4.	$76\overline{)6156}$	$26\overline{)1846}$
5.	$46\overline{)3266}$	$56\overline{)4592}$

Race IX

1.	$37\overline{)2627}$	$36\overline{)2916}$
2.	$56\overline{)3584}$	$26\overline{)1690}$
3.	$29\overline{)599}$	$67\overline{)5594}$
4.	$67\overline{)6257}$	$63\overline{)3912}$
5.	$69\overline{)2898}$	$86\overline{)4472}$

Race X

1.	$47\overline{)4277}$	$58\overline{)4756}$
2.	$56\overline{)2912}$	$68\overline{)2788}$
3.	$48\overline{)1968}$	$29\overline{)1508}$
4.	$32\overline{)2656}$	$57\overline{)2964}$
5.	$45\overline{)3150}$	$36\overline{)2412}$

Owning a Car

1. Mr. Jones bought a car for $1575. If he paid for it in 25 equal payments, what was the amount of each payment?

2. He built a garage costing $900 and arranged to pay for it in 36 months. If he paid the same amount each month, what was the amount of the monthly payment?

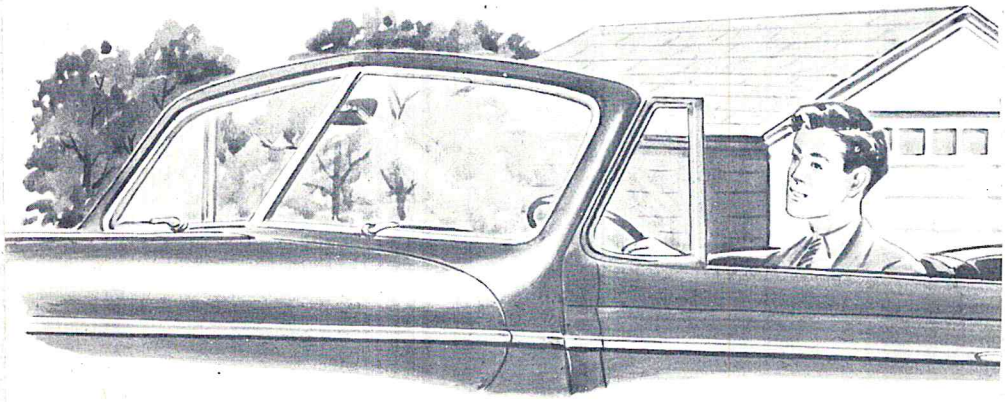
3. Mr. Jones made a trip of 2,520 miles. If he averaged 45 miles an hour, how many hours in all did he drive?

4. If he averaged 21 miles per gallon of gasoline on this trip, how many gallons did he use?

5. Mr. Jones says that it cost him $572 to run his car last year. What was the average cost per week? (There are 52 weeks in a year.)

6. Last year he used 1716 gallons of gasoline. What was the average number of gallons he used each week?

7. In one month he drove 2,016 miles and used 96 gallons of gasoline. How many miles did he average per gallon?



First Call to the Rifle Range

Form the class into two equal squads for drill. Squad A will find the quotients in the first group. Squad B will find the quotients for the second group. The squad with more perfect papers wins.

About face! This time Squad A will work the second group while Squad B does the first.

First Group. Divide and check.

1.	$7\overline{)65}$	$70\overline{)285}$	$7\overline{)854}$	$8\overline{)917}$	$46\overline{)368}$
2.	$38\overline{)275}$	$46\overline{)3404}$	$48\overline{)3560}$	$17\overline{)121}$	$18\overline{)761}$
3.	$19\overline{)969}$	$13\overline{)117}$	$63\overline{)4725}$	$74\overline{)4662}$	$85\overline{)537}$
4.	$28\overline{)196}$	$5\overline{)382}$	$6\overline{)192}$	$40\overline{)240}$	$8\overline{)72}$

Second Group

5.	$7\overline{)63}$	$7\overline{)231}$	$7\overline{)864}$	$89\overline{)382}$	$24\overline{)1572}$
6.	$26\overline{)1912}$	$16\overline{)544}$	$17\overline{)742}$	$18\overline{)126}$	$67\overline{)1753}$
7.	$23\overline{)185}$	$44\overline{)308}$	$4\overline{)768}$	$9\overline{)75}$	$30\overline{)270}$
8.	$8\overline{)515}$	$60\overline{)256}$	$6\overline{)939}$	$74\overline{)518}$	$84\overline{)4546}$

Every soldier should have had 20 right answers in each group. Any soldier with less than 18 right answers in either group should drill on page 136.

Others may turn to page 137.

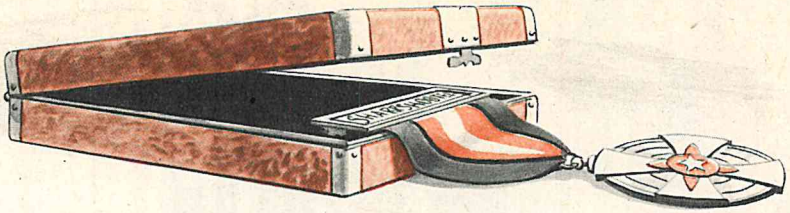
Second Call for Rifle Practice

Here is your chance to get a perfect score. Begin at the bottom of ladder A. If you reach the top of the ladder without a mistake, you need not climb the other ladders. If you make a mistake, climb B and C for practice.

Each trooper must be able to climb one ladder perfectly.

	Ladder A	Ladder B	Ladder C
7.	47)3863	32)2881	90)672
6.	88)2212	79)2617	44)2389
5.	34)2924	46)3496	58)4814
4.	45)1395	56)1456	73)4161
3.	38)243	59)482	36)267
2.	77)321	88)631	93)567
1.	50)300	60)540	69)552

You may now work page 138.



Sharpshooters Learn a Secret Short Cut

1. Divide 4731 by 57.

Round 57 to the nearest 10.

Round 473 to nearest station number for 60.

To find the second quotient figure, round 171 to the nearest station number for 60.

$$\begin{array}{r} 83 \\ 57\overline{)4731} \\ 456 \\ \hline 171 \\ 171 \\ \hline \end{array}$$

Think $60\overline{)480}$

Think $60\overline{)180}$

Copy and divide. Use the secret short cut.

2. $56\overline{)4816}$ $88\overline{)7304}$ $47\overline{)3431}$ $79\overline{)6557}$

3. $38\overline{)3176}$ $27\overline{)1832}$ $59\overline{)5384}$ $76\overline{)6277}$

The secret short cut may give a quotient figure that is too small or too large. Always test.

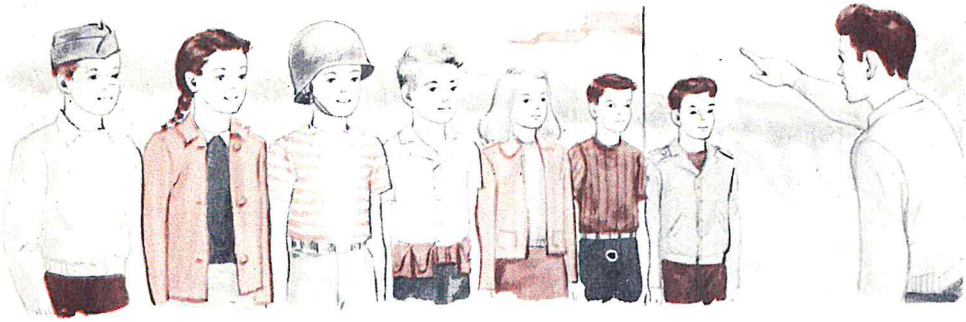
4. Divide 3276 by 36.

Round 36 to 40, and round 327 to $8 \times 40 = 320$. The quotient figure 8 is too small, for the remainder 39 is larger than the divisor. *The remainder must always be less than the divisor.*

$$\begin{array}{r} 8 \\ 36\overline{)3276} \\ 288 \\ \hline 39 \end{array} \qquad \begin{array}{r} 91 \\ 36\overline{)3276} \\ 324 \\ \hline 36 \\ 36 \\ \hline 0 \end{array}$$

Copy and divide. Use the secret short cut.

5. $26\overline{)2132}$ **6.** $35\overline{)3220}$ **7.** $37\overline{)2997}$ **8.** $28\overline{)2548}$



Dress Parade—Review of Unit 5

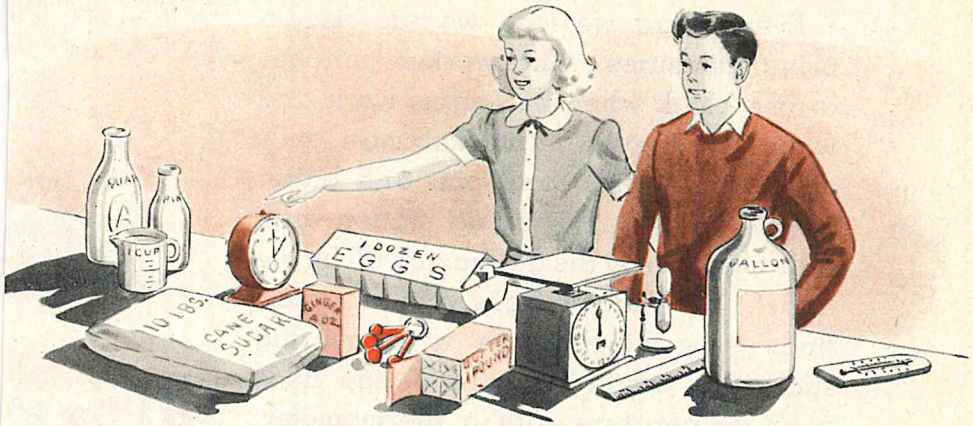
1. Farmer Brown planted 240 fruit trees. If $\frac{1}{2}$ are apple trees, $\frac{1}{3}$ are plum trees, and $\frac{1}{6}$ are cherry trees, how many of each kind are there?

2. A canning club made 312 glasses of jelly to serve in the school lunchroom. If $\frac{1}{8}$ of this was currant jelly, $\frac{1}{4}$ blackberry jelly, $\frac{1}{8}$ strawberry jelly, $\frac{1}{6}$ plum jelly, and $\frac{1}{3}$ raspberry jelly, how many glasses of each kind were there?

3. Ann arranged the 312 glasses of jelly equally on 13 shelves. How many glasses did she have on each shelf?

4. Find the number of bushels and the number of pounds over for each of the following lots of field seeds.

Seed	Pounds per bu.	Pounds in lots
Choice timothy	45	972
Kentucky blue grass	21	381
Red top—cleaned	32	729
Red top—in chaff	14	238
Canadian blue grass	21	869
Broom corn	50	944



Using Measures

1. Make a list of 10 measures which you see in the picture above. Which of these measure liquids? Which measure weight? Which are dry measures? Which are measures of number? Which are measures of time? Which is a measure of temperature?

2. Name three things that are bought by the quart liquid measure. Name three things that are bought by the quart dry measure.

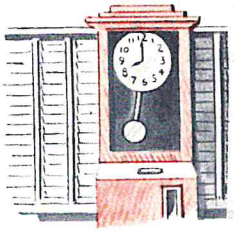
3. Name three things that are bought by the dozen.

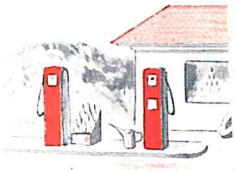
4. Name three things that are bought by weight.

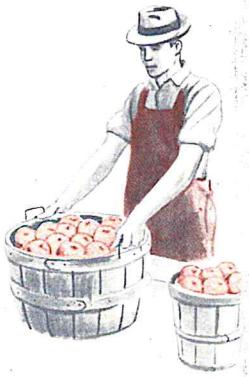
5. Name something that is bought by the ounce; by the pint; by the ton; by the peck; by the bushel.

6. Make a collection of all the tables of weights and measures you can find.

Measures Have Many Uses







Everywhere we look we see people using measures. The worker punches a time clock when he begins work and when he leaves. The milkman sells milk by the quart and pint and butter by the pound. The filling station man sells gasoline by the gallon and oil by the quart. The nurse weighs you on scales, finds your height with a measuring stick, and when you are ill she finds your temperature with a thermometer. The farmer sells apples and potatoes by the bushel. When you travel, road signs tell you how many miles it is to the next town.

1. What measure would you use in selling coal?

2. What measure would you use in selling eggs?

3. Short lengths are measured in feet or inches. How are long distances measured?

For Your Notebook

Cut out any pictures you can find of people using measures and of scales, rulers, measuring cups, and so on. Paste these in your notebook.

Liquid Measure

Be sure to have these measures in the classroom tomorrow. Different children can bring those that are lacking now.

Quart milk bottle
Pint milk bottle
Gallon glass jug
Half-pint cream bottle
Measuring cup

Table of Liquid Measure

2 pints (pt.)	=	1 quart (qt.)
4 quarts (qt.)	=	1 gallon (gal.)

Test the table above by these pouring activities:

1. Pour water from a pint bottle into a quart bottle. How many pint bottles does it take to fill a quart bottle?

2. Pour water from a quart bottle into a gallon jug. How many quart bottles does it take to fill the gallon jug?

Answer yes or no to each question 3 to 6.

3. Is a pint one-half of a quart?

4. Is a gallon four times a quart?

5. Are there 8 pints in a gallon?

6. Is a quart equal to one-fourth gallon?

7. Jane bought a half gallon of milk. How many quarts was this?

8. The grocer bought 32 quarts of milk. How many gallons was this?

More About Liquid Measures

A glass or a cup holds about one-half pint.

1. Joan pours 2 pints of milk into glasses. How many glasses of milk will there be?

2. A recipe for rolls calls for 2 cups of milk. Will a pint of milk be enough?

3. Robert drinks a quart of milk a day. How many glasses is this?

Say the number that belongs in place of each $*$.

4. 24 qt. $= *$ gal. 3 gal. $= *$ qt.

5. 6 qt. $= *$ pt. 28 pt. $= *$ qt.

6. 48 gal. $= *$ qt. 48 qt. $= *$ gal.

7. The man at the ice cream stand pays $1.80 for a gallon of ice cream and sells it at 60 cents a quart. How much does he make on each gallon that he sells?

For Your Notebook

Describe 10 things that are measured by liquid measure. Either draw, or cut out and paste in your notebook, a picture of each thing you describe.

Problems Using Liquid Measure

1. A quart of ice cream makes 8 servings. How many quarts will you need to serve 32 persons? How many gallons is this? How much more would you need to serve 4 more guests?

2. A pint of oysters will make enough soup to serve 4 persons. How many pints must you buy to make soup for 12 persons? At 35¢ a pint, what will the oysters for 12 persons cost?

3. Mr. Bradford sells 27 gallons of milk a day. How many quarts is this?

Small quantities are sold by the **gill.** There are 4 gills in 1 pint. The smallest cream bottle you can buy is $\frac{1}{4}$ pint, or 1 gill.

4. Mr. Bradford sells 2 gallons of cream a day. How many pint bottles would this be? How many $\frac{1}{4}$ pints or gills?

5. Mr. Allen made 123 gallons of maple syrup. How many quarts would this be? How many pints?

6. Mr. Foster has about 31 gallons of vinegar in a barrel. How many pint bottles would this fill?

7. A quart brick of ice cream costs 35¢. At this rate what must I pay for 2 gallons?

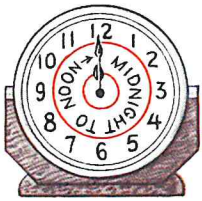
8. Mother made a gallon jug full of lemonade for a picnic. How many quarts of lemonade was this? How many pints? How many glasses of lemonade would this very likely be?

9. How many pint jars can I fill if I make 5 qt. of jam?

While the Clock Ticks

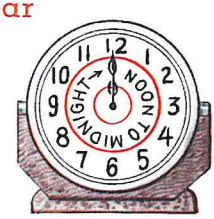
Table of Time

60 seconds (sec.) = 1 minute (min.)
60 minutes = 1 hour (hr.)
24 hours = 1 day (da.)
7 days = 1 week (wk.)
4 weeks = one average month (mo.)
12 months = 1 year (yr.)
365 days = 1 regular year
366 days = 1 leap year



Twice Around the Clock

A day is 24 hours. A clock face measures only 12 hours. A whole day is "twice around the clock." A day begins at midnight and lasts until the next midnight. From 12 o'clock midnight until 12 o'clock noon is once around the clock or the first half day.



The second half of a day begins immediately after 12 o'clock noon and ends at midnight. This is the second time around the clock.

Hours from 12 o'clock midnight until 12 o'clock noon are marked A.M. to show they are before noon.

Hours from 12 o'clock noon until 12 o'clock midnight are marked P.M. to show they are after noon.

1. I got up at 3 A.M. to go fishing. Did I get up early?

2. The train I was waiting for arrived at 11.30 P.M. Why was I sleepy?

Finding Time

1. If Tom rode his bicycle from 9 A.M. to 11 A.M., how many hours did he ride?

To find the number of hours between two given times, subtract the earlier hour from the later if both are before noon, or if both are after noon. Tom rode $11-9=2$ hours.

2. Edna sewed on her quilt from 1 P.M. to 5 P.M. How long did she sew?

3. Find the number of hours from

4 P.M. to 11 P.M. 2 P.M. to 12 P.M.

4. Mother cleaned house from 9 A.M. to 5 P.M. How many hours did she work?

When one given time is before noon and the other is after noon, you must find the number of hours before noon and the number of hours after noon and add them together to find the number of hours between the given times.

From 9 A.M. to 12 noon is 3 hours. From 12 noon to 5 P.M. is 5 hours. Added together the time is 8 hours.

5. Find the number of hours from

6 A.M. to 1 P.M. 8 P.M. to 4 A.M.

6. Use the table of time on page 144 and find:

$\frac{1}{4}$ hr. in min. $\frac{1}{2}$ min. in sec. $\frac{1}{3}$ day in hr.

$\frac{1}{2}$ yr. in mo. $\frac{1}{5}$ yr. in da. $\frac{1}{2}$ mo. in wk.

7. Find the missing numbers:

3 yr. = $*$ mo. 2 yr. = $*$ da. 4 hr. = $*$ min.

8 wk. = $*$ da. 7 da. = $*$ hr. 15 min. = $*$ sec.

Measures of Weight

16 ounces (oz.) = 1 pound (lb.)
2,000 pounds (lb.) = 1 ton (T.)

1. Ask someone to bring a household scale from home. Find something in the classroom that you think weighs about 1 lb. Weigh it.

2. Weigh a book, an eraser, a tablet. Guess how much each weighs before you weigh it.

3. A large egg weighs about 2 oz. A large slice of bread weighs about 1 oz. Two tablespoonfuls of sugar weigh about 1 oz. Find six things that weigh about as much as any of these three things. Weigh them to find if you are right.

4. Find other things in the room to weigh. See how well you can estimate the weight before you put it on the scale.

5. Fancy peanuts cost 5¢ an ounce. How much is this a pound?

6. Mr. Lamb used 12 tons of coal last winter. How many pounds was this? If there are 80 pounds of soft coal to a bushel, how many bushels was this?

7. Tom's father carried a ton of coal into the basement. If he used a bushel basket to carry the coal, how many trips did he make?

8. A peddler sells coal at 25¢ a bushel. How much is this a ton?

9. Mrs. Brown bought a half pound of tea. How many ounces was this?

From Long Ago

Years ago potatoes and apples were sold by the peck or bushel. Many things once sold by dry measure are now sold by weight. Dry measure is still sometimes used, so we must learn it.

Table of Dry Measure

2 pints (pt.) = 1 quart (qt.)
8 quarts (qt.) = 1 peck (pk.)
4 pecks (pk.) = 1 bushel (bu.)

1. Find the cost of 2 quarts of strawberries at 12¢ a pint.

2. How many quarts are in 1 bushel? In $\frac{1}{2}$ peck?

3. Mrs. Hart sold 12 pecks of dried beans at 9¢ a quart. How much did she get for them?

4. How many pecks are in 5 bushels? In $\frac{1}{2}$ bushel?

5. How many quart boxes can one fill from 1 bushel of cherries?

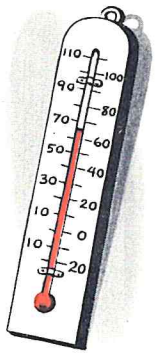
You can change dry measure to weight measure. The table below gives the weight in pounds of 1 bushel of each of four common articles.

Soft coal	80 lb.	Potatoes	60 lb.
Shelled corn	56 lb.	Wheat	60 lb.

6. What is the weight of 12 bushels of soft coal?

7. A farmer sold potatoes at 80¢ a bushel. The grocer sells them at the rate of 15 pounds for 25 cents. Which is cheaper? How much cheaper?

The Ups and Downs of the Thermometer



Examine your classroom thermometer. If there is none in your classroom, have someone in the class bring a thermometer from home.

A thermometer is really only a glass tube like a long, thin glass jar with mercury inside. When the temperature grows warmer, the mercury rises. When the temperature grows cooler, the mercury goes down.

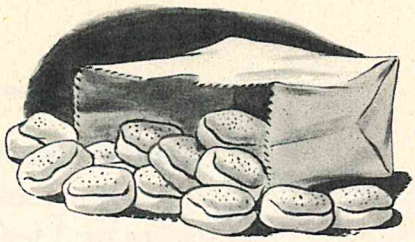
The sign ° means degree. Thermometers are marked off in degrees, as a ruler is marked off in inches. Temperature is measured in degrees.

1. Draw six thermometers exactly like the one above.

2. Show these temperatures on the thermometers you have drawn:

a. Water freezes at 32°.
b. Your body temperature is about 98°.
c. A comfortable room temperature is about 70°.
d. A sick person may have a temperature of 104°.
e. Last winter the temperature fell to 12° below 0.
f. Last summer the temperature rose to 109°.

Counting Measures



12 things = 1 dozen (doz.)
12 dozen = 1 gross (gro.)
144 things = 1 gross (gro.)

Customers usually buy rolls, oranges, lemons, eggs, and like things by the dozen. Storekeepers buy pencils, erasers, tubes of tooth paste, and like things by the gross.

1. How many things are in 1 dozen eggs? One-half dozen oranges? Two dozen lead pencils?

2. How many things in a gross of tooth brushes? In $\frac{1}{4}$ gross of tubes of tooth paste? In 3 gross of lead pencils?

Matching Game

Copy column A in your notebook, and write the correct answer to each. The answers are in column B, but badly mixed up. You will have to pick out the right ones.

Column A	Column B
1. 1 bushel is	12 months
2. 111° is	comfortable temperature
3. 16 ounces are	4 pecks
4. 20° below zero is	1 minute
5. A ton of coal weighs	1 pound
6. 24 hours make	too warm
7. 1 year is equal to	2,000 pounds
8. 70° is a	12 dozen
9. 60 seconds are	very cold
10. A gross is	1 day

Measures of Length

Shorter Measures of Length

12 inches (in.) = 1 foot (ft.)

36 inches or 3 feet (ft.) = 1 yard (yd.)

1. What do you do to change feet to inches? Yards to inches? Yards to feet?

2. Find the missing numbers:

5 ft. = * in.	8 yd. = * ft.	3 yd. = * in.
9 yd. = * ft.	12 yd. = * in.	15 yd. = * ft.
19 ft. = * in.	42 ft. = * in.	21 yd. = * in.

3. What do you do to change inches to feet? Inches to yards? Feet to yards?

4. Find the missing numbers:

27 in. = * ft.	72 in. = * yd.	144 in. = * yd.
75 ft. = * yd.	96 in. = * ft.	45 ft. = * yd.

5. Mother made a quilt that is 81 in. long. How many feet is this?

6. She bought a table cloth that is 108 in. long. How many yards long is it?

7. The sheets she bought are marked 72 in. wide. How many feet wide are the sheets?

8. Say the answers quickly:

$\frac{1}{2}$ ft. = * in.	$\frac{1}{3}$ ft. = * in.	$\frac{1}{4}$ ft. = * in.
$\frac{1}{2}$ yd. = * in.	$\frac{1}{3}$ yd. = * ft.	$\frac{1}{3}$ yd. = * in.
3 yd. = * ft.	2 ft. = * in.	$1\frac{1}{2}$ ft. = * in.
$\frac{1}{6}$ ft. = * in.	$\frac{1}{6}$ yd. = * in.	27 ft. = * yd.
18 ft. = * yd.	8 yd. = * in.	48 in. = * ft.

Longer Measures of Length

$16\frac{1}{2}$ feet (ft.) = 1 rod (rd.)

5,280 feet or 320 rods (rd.) = 1 mile (mi.)

City people make little use of the rod measure, but farmers use it often.

1. Wire fencing is bought in 40-rod rolls. How many feet are in a roll?

2. Measure the length of 1 rod along the side of your classroom.

3. Name some place about 1 mile from school. Name some place about 5 miles from school.

4. Some airplanes were flying more than 25,000 feet high. About how many miles is this?

5. The highest mountain in the world is 29,141 feet high. How many miles high is it? How many feet are left over? Check your work.

6. The deepest place in the ocean is 35,400 feet deep. How many miles deep is this? How many feet are left over? Check your work.

7. The highest mountain in North America is 20,300 feet high. How many miles high is this? How many feet are left over? Check your work.

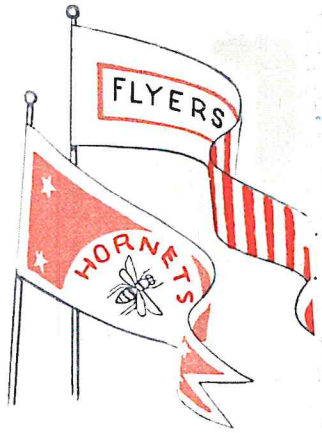
8. If a parachute jumper jumps out at a height of 3 miles, how many feet does he fall?

9. An airplane is flying a mile and a half high. How many feet up is it?

10. A submarine is resting on the ocean floor 3 miles below the surface. How many feet down is it?

Pennant Races in Mixed Practice

Choose your teams. After each race have someone work the examples correctly on the blackboard. Help your team to win.



Race I

1. Add 6, 94, 231, 45, and 7.
2. Find the sum of 23 and 526.
3. $35.82 + $4.24 + $235.02 =
4. 332 + 56 + 789 + 3 + 45 =
5. 356 + 478 + 609 + 3652 =
6. Add 7, 84, 423, 31, and 8.
7. Find the sum of 54 and 782.
8. $25.39 + $5.27 + $259.30 =
9. 759 + 45 + 537 + 56 =

Race II

1. 4632 − 483 =
2. Subtract 354 from 392.
3. 4009 less 25 is __.
4. Take 67 from 2000.
5. 5836 − 354 =
6. 1238 − 463 =
7. 5002 less 18 is __.
8. Take 46 from 8000.

Race III

1. 45 times 135 =
2. Multiply 4803 by 43.
3. 453 × 465 =
4. $45.90 × 25 =
5. 56 times 392 =
6. Multiply 3802 by 26.
7. 587 × 398 =
8. $26.54 × 35 =

Race IV

1. Divide 4564 by 4.
2. 280 ÷ 70 =
3. 3640 ÷ 44 =
4. Divide 4372 by 3.
5. 640 ÷ 80 =
6. 2378 ÷ 58 =

These Fractions Are Somewhat Different

1. Write these fractions in figures: one-fourth, one-half, one-sixth, one-eighth, one-third.

You write one-third as $\frac{1}{3}$ and two-thirds as $\frac{2}{3}$.

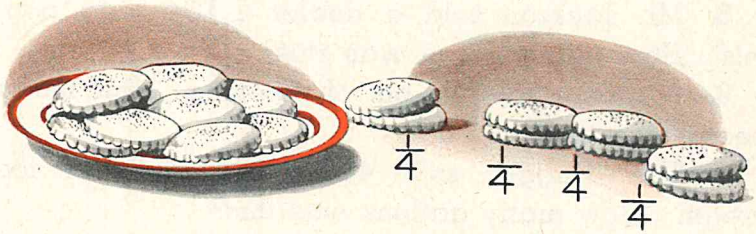
2. Write as figures: three-fourths, five-sixths, five-eighths.

3. Read these fractions: $\frac{5}{6}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{3}{8}$, $\frac{2}{3}$, $\frac{7}{8}$.

4. Would you rather have $\frac{1}{4}$ of a good cake or to have $\frac{3}{4}$ of it? Draw a picture and explain.

5. Would you rather have $\frac{1}{4}$ of a dozen pieces of candy, or to have $\frac{1}{3}$ of a dozen? Draw a picture.

6. Eight cookies were on a plate. Jack ate $\frac{3}{4}$ of them and Sue ate $\frac{1}{4}$ of them. How many cookies did each eat?



In finding $\frac{3}{4}$ of a number, you first find $\frac{1}{4}$ of the number. One-fourth of 8 is 2. Then $\frac{3}{4}$ of 8 is 3 times 2 or 6.

Jack ate 6 cookies, and Sue ate 2 cookies.

7. Harold had 12 papers and sold $\frac{2}{3}$ of them. How many did he sell?

8. Jane had 16 Easter eggs and gave away $\frac{5}{8}$ of them. How many did she give away?

Practicing with Measures

1. Sailors lost at sea floated 28 days on a raft. How many hours was this?

2. Jack is 60 inches tall. How many feet tall is he?

3. An airplane rose 5 miles into the air. How many feet was it then above the earth?

4. Farmer Brown sold 6 T. of hay. How many pounds was this?

5. Mother made a curtain 3 yards long. How many feet long is it?

6. Father said, "I'll be home in a quarter of an hour." How many minutes is that?

7. A druggist's sales last year amounted to $47,996. What were his average weekly sales?

8. Mr. Jackson sold a dealer 1,104 lead pencils. How many dozen was this?

9. A grocer sold 16 bu. of potatoes. How many pecks was this?

10. The druggist sold 48 quart bricks of ice cream. How many gallons was this?

11. John sleeps 8 hours a day. How many hours does he sleep in a week?

12. The Smith family spend an average of $47.50 a week. How much will they spend in a year?

No pencils please. Say the answers quickly.

13. $\frac{1}{3}$ ft. = * in.

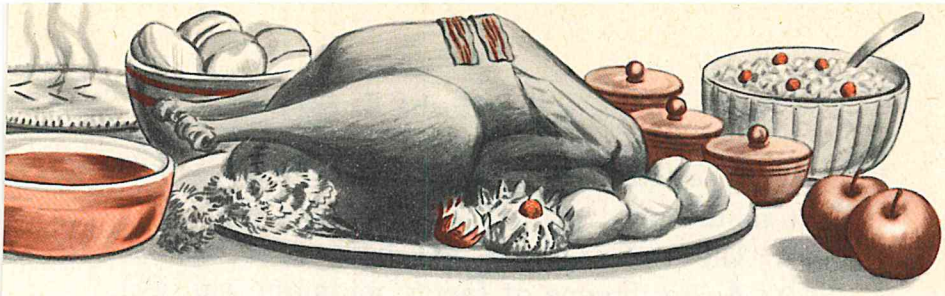
14. $\frac{1}{4}$ gal. = * qt.

15. $\frac{1}{4}$ lb. = * oz.

16. $\frac{3}{4}$ hr. = * min.

17. $\frac{2}{3}$ da. = * hr.

18. 4 wk. = * da.



What a Turkey Dinner!

Grandfather and Grandmother asked us to the farm for dinner. Aunt Judy and Uncle Frank said they would go along, too, and surprise Grandmother.

What a hurry and flurry there was! Grandmother quickly added two more places at the table. In the rush the turkey lost his head. In fact, much more than that was subtracted from that fine fellow. Every second our thrills multiplied. By the time Grandfather divided the pumpkin pies, we could hardly eat any more.

Add Subtract Multiply Divide
Which shall it be?

1. Grandmother paid 48¢ a pound for the turkey. If it weighed 18 pounds, what did it cost?

2. Grandmother baked 4 doz. cookies. She gave us 15 to take home. How many were left?

3. The children drank 2 gallons of milk. How many quarts was this? How many pints?

4. Grandmother baked 3 dozen biscuits. They ate $\frac{3}{4}$ of them for dinner. How many biscuits did they eat for dinner?

Pick the Right Answer

Copy each sentence below in your notebook. Put in the one number that makes it true.

1. There are (12, 24, 60) hours in a day.

2. A day begins at (noon, midnight, sunrise).

3. August is the (10th, 9th, 8th) month.

4. January has (28, 30, 31) days.

5. A ten-year-old boy should weigh about (85, 200, 350) pounds.

6. There are (12, 16, 2,000) ounces in a pound.

7. Water freezes at (32°, 70°, 98°).

8. Dry measure is good for measuring (eggs, sugar, fresh berries).

9. There are (12, 8, 4) quarts in a peck.

10. Liquid measure is good for measuring (butter, dried beans, milk).

11. There are (2, 4, 8) pints in a gallon.

12. There are (12, 18, 36) inches in $\frac{1}{2}$ yard.

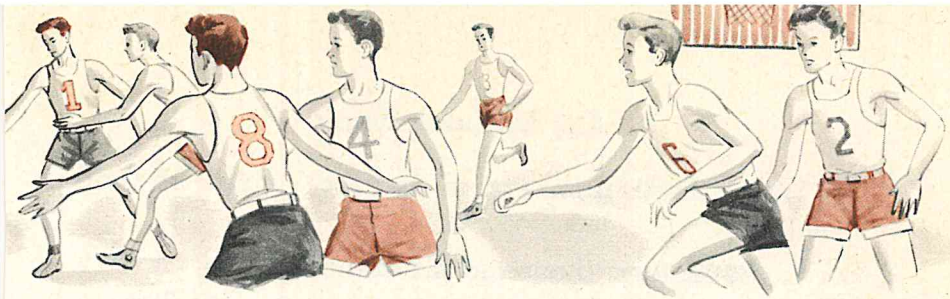
13. A comfortable room temperature is about (32°, 70°, 98°).

14. There are (320, 1,760, 5,280) yards in a mile.

Lest We Forget

Divide and check:

a	b	c	d
1311 ÷ 23	3854 ÷ 47	1581 ÷ 51	3952 ÷ 76
1912 ÷ 26	3560 ÷ 48	4662 ÷ 74	1404 ÷ 18
2491 ÷ 53	4524 ÷ 87	5358 ÷ 94	5600 ÷ 67
1240 ÷ 19	3674 ÷ 72	4158 ÷ 77	4336 ÷ 98



A Contest Page

Odds or Evens! Who Wins?

Score Board

Number of Perfect Scores

Team	I	II	III	IV
Odds				
Evens				

Divide into two teams. Keep a record on the scoreboard of your test results.

Section I. Add:

1.

5		34	284		$6.85	$0.97
4	48	57	362	$3.15	2.35	.38
9	33	69	129	2.25	1.17	.65

Section II. Subtract:

2.

53	485	674	536	824	$6.10	$1.43
38	251	136	242	356	2.54	.95

Section III. Multiply:

3.

347	939	618	773	$1.27	$3.35	$0.94
12	45	28	47	6	21	9

Section IV. Divide:

4. $4\overline{)\$0.84}$ $3\overline{)\$0.84}$ $8\overline{)\$4.64}$ $21\overline{)\$7.35}$

Let Us Look Back

Write these numbers in figures. Point off correctly.

1. Seventeen thousand six hundred two
2. Five million forty thousand one hundred ten
3. 422 million, 300 thousand, 97
4. 2 million, 265 thousand, 1
5. 73 million, 426 thousand
6. A carved stone in the library building said the stone was laid in MCMXLV. What year was that?
7. In what year was each of the schools built?
   Adams MDCCCLXXVIII Lowell MCMXXVI
   Jackson MDCCCXCVIII Madison MCMXI
8. There are 924 pupils in the Lowell School. If $\frac{2}{3}$ of them have not been tardy this year, how many have been on time every day?
9. The Lowell School had a picnic. The principal ordered 12 buses. If all the children went, how many pupils were in each bus?
10. The Lowell School sells lunches. Mary bought a sandwich for 6¢, a glass of milk for 5¢, and 2 apples for 3¢ each. How much did the whole lunch cost?
11. Jack bought two 6-cent sandwiches, a bottle of milk for 5¢, an apple for 3¢, and a package of cookies for 7¢. How much did he pay in all?
12. Joan bought a 16-cent plate lunch and a bottle of milk for 5¢. How much did she spend?

13. Elmer's mother bought an ice box for $224. How long will it take her to pay for it at the rate of $7 a month?

14. Elmer's father bought a used car for $795. The dealer allowed him $150 on his old car. How much did he still owe?

15. John earns 10 cents a day. How much can he earn in a month of 30 days?

16. Mr. Jones pays $45 a month rent. What is his rent for a year?

17. A fast train averages 84 miles per hour. How many hours will it take to travel 924 miles?

18. The Sky Sleeper travels about 175 miles per hour. How long will it take to fly 1,400 miles?

19. Father uses a gallon of gasoline every time he rides 20 miles. How many gallons will he use in traveling 80 miles? 100 miles?

20. Mr. Jackson says he can go only 18 miles on a gallon of gasoline. How many gallons will he use on a trip of 2,484 miles?

21. Mr. Jackson bought 4 tires at $14.95 each. What did his tires cost?

22. He had some repairs made on his car. He paid $14.50 for labor, $16.75 for parts, and $.75 for a grease job. What was his total bill?

23. Father paid $2.12 for gasoline for his car. He also paid $.75 to have the car washed. What change should he get back from a 5-dollar bill?

24. Father's gasoline tank holds 16 gallons. If the tank is $\frac{3}{4}$ full, how many gallons are there in it?

Reviewing Units of Measure

Mother said the new garden was 180 feet long. Father had said it was 60 yards long. Could they both be right?

Both feet and yards are units of measure. A yard is longer than a foot, so that it takes a smaller number of yards than of feet to reach a given distance. It takes only 60 yards to reach the length of the garden, while it takes 180 feet to reach the same length.

1. Change 80 yards to feet.

To change from a larger to a smaller unit of measure, you multiply to find the answer.

2. Change 252 feet to yards.

When you change from a smaller unit to a larger unit of measure, you divide to find the answer.

3. Tell whether you divide or multiply to change:

quarts to pecks feet to inches gallons to quarts
days to years hours to days ounces to pounds

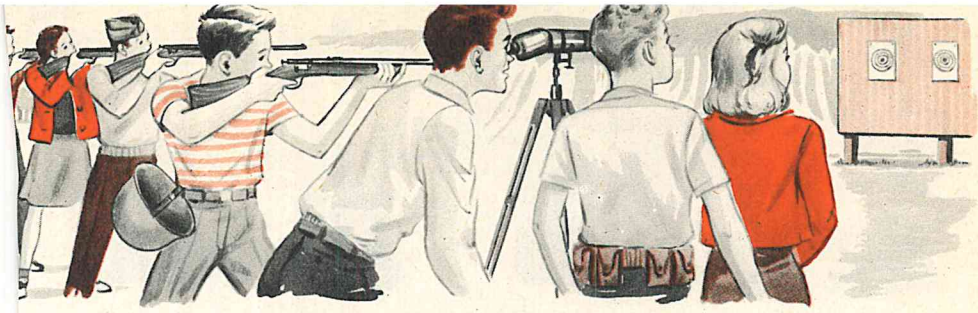
4. Change:

6 hr. to min. 96 hr. to da. 288 in. to ft. 6000 lb. to T.
48 oz. to lb. 16 gal. to qt. 32 pt. to qt. 360 pk. to bu.

5. One rug is $2\frac{1}{2}$ ft. long. Give its length in inches. How many inches long is a $4\frac{1}{4}$ ft. rug? A $3\frac{1}{3}$ ft. rug?

2 ft. = 24 in.
$\frac{1}{2}$ ft. = 6 in.
$2\frac{1}{2}$ ft. = 30 in.

6. How many inches long is a $2\frac{1}{2}$-yd. curtain? A $2\frac{1}{4}$-yd. curtain? A $2\frac{1}{2}$-yd. curtain?



First Call to the Rifle Range

1. The largest measure we have learned for time is the year. What is the largest measure we have learned for: weight? length? liquids?

2. What is the smallest measure we have learned for: time? length? liquids? dry measure?

What measure would you use to find—

3. the distance between two cities?

4. the weight of a beef roast?

5. the length of your classroom?

6. how cold it is?

7. Mr. Todd's farm is one-half mile wide. How many rods wide is it?

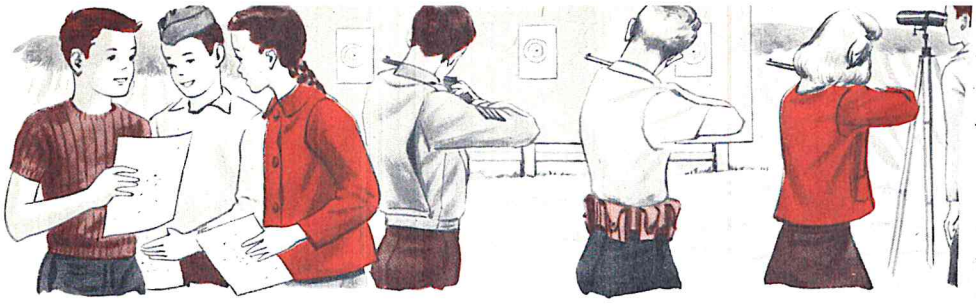
8. A bicycle that cost $42 was sold for $\frac{5}{6}$ its cost. For how much was it sold?

9. Which would you rather have: one-half gross candy bars or 5 dozen candy bars?

10. Father lacks 1 inch of being 6 feet tall. How many inches tall is he?

There are 10 targets on this page. If you hit at least 8 of them, you are a sharpshooter. You can work on page 163.

The rest will find more practice on page 162.



Second Call to the Rifle Range

After each section, mark your papers with red crayon. If you have missed any targets, study the pages given in parentheses after the section number.

Section I (150, 151, 154)

1. How many inches are in 3 feet? In 2 yards?

2. How many yards in 147 feet? In one mile? In two rods?

3. How many feet in 84 inches? In 2 rods?

Section II (146, 154)

4. How many ounces are in 3 lb.? In $\frac{1}{4}$ lb.?

5. How many pounds in 4 T.? In $6\frac{1}{2}$ T.?

6. How many ounces in $\frac{3}{8}$ lb.? In $\frac{3}{4}$ lb.?

Section III (144, 145)

7. How many hours are in $\frac{1}{2}$ day? In 1 week?

8. How many days are in an ordinary year?

9. How many minutes in $\frac{1}{4}$ hour? In 2 hours?

Section IV (141, 142, 143, 147, 149, 154)

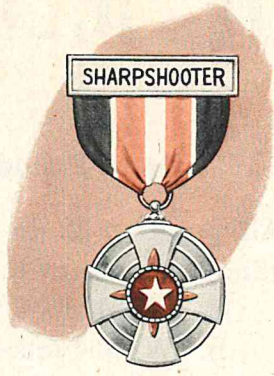
10. How many gallons are in 2 dozen pints?

11. How many quarts (dry measure) in a peck? In a bushel? In $\frac{1}{2}$ bushel?

12. How many things are in $\frac{1}{2}$ dozen? In 1 gross? In 3 dozen?

Now work page 164.

Special Jobs for Sharpshooters



1. Form a committee to find out all you can about weight and height tables for children. Bring some of these tables to school.

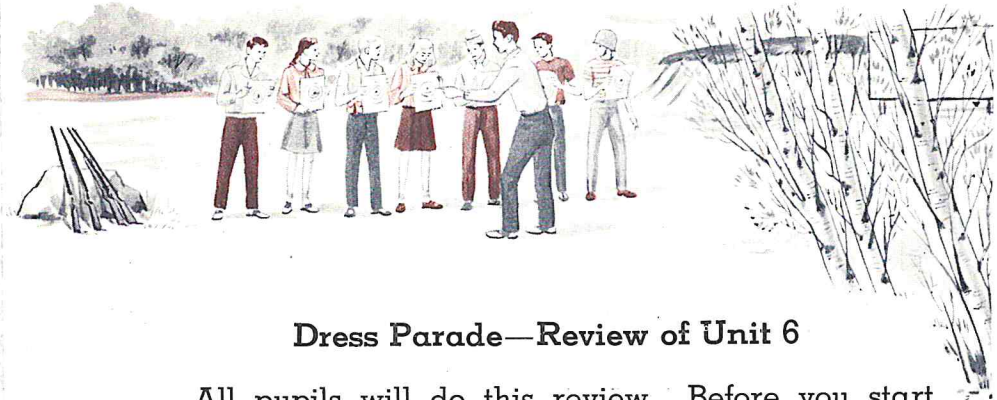
Measure and weigh various pupils. Compare their heights and weights with the heights and weights shown in the tables.

2. Can you remember which of the months have 31 days, which have 30 days, and which has 28 or 29 days? This jingle will help you.

Thirty days have September,
April, June, and November.
All the rest have thirty-one
Save February alone,
To which we twenty-eight assign
Till leap year gives it twenty-nine.

3. If the number of a year, as 1944, 1948, or 1952, can be divided evenly by 4, the year is a leap year. Which of these years is a leap year: 1934, 1958, 1964?

If the number of the year ends in two zeros, as 1900, the year is a leap year only when the number can be divided evenly by 400. Which of these years is a leap year: 1400, 1600, 1800?



Dress Parade—Review of Unit 6

All pupils will do this review. Before you start writing, ask yourself these questions:

a. What does the problem want to know?

b. What facts does the problem give?

c. What must I do with the numbers that are given to get the right answer?

1. I can buy oranges at the rate of 3 for 10¢. How much will a dozen cost?

2. I have a garden plot 24 feet by 18 feet. How much wire will it take to go around it?

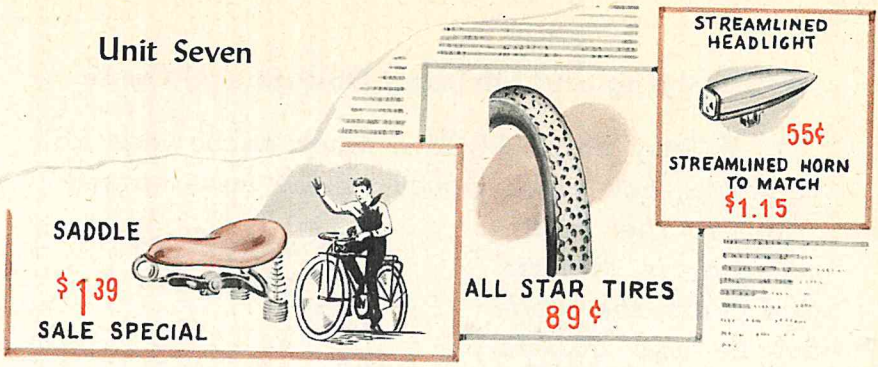
3. Mother's curtains were 78 inches long until she washed them. Each shrank 6 inches. The windows are exactly 6 feet. Will the curtains be long enough?

4. Which is longer, an 8-ft. table cloth, or one that is 90 in. long?

5. Which is taller, a tree that is $4\frac{1}{2}$ ft. tall, or one that is 56 in. tall?

6. John is 8 inches taller than his little brother. The little brother is $4\frac{3}{4}$ feet tall. How tall is John?

7. Mr. Hale begins work at 7:30 P.M., works 4 hours, has 30 minutes for a lunch, and works 4 hours more. When does he quit work?



Remember the Decimal Point

1. Jerry had $4.50. He spent $1.39 for a saddle for his bicycle. How much did he have left?

Remember: When you subtract dollars and cents, keep the decimal points exactly under each other.

$4.50
− 1.39
$3.11 Left

2. Jerry earned $1.75 cutting grass for two neighbors. If he bought a bicycle tire for $.89, how much will he have left?

3. Jerry got $1.00 from his mother for keeping the dead leaves raked from the lawn. He paid 55¢ for a streamlined headlight. How much did he have left from his dollar? (How must you write 55¢ before you subtract?)

4. Jerry worked hard to earn a horn to match his headlight. He earned $.45 cutting grass, $.25 running an errand, $.70 selling magazines. How much of this money did he have left after he bought the new horn for his bicycle?

Multiplying and Dividing Dollars and Cents

1. If Jerry earns $1.25 a week each week for 15 weeks, how much money will he have earned?

When the multiplicand is dollars and cents, the product is also dollars and cents. The multiplicand has two decimal places to show cents. Write a dollar sign in front of the product.

$1.25 multiplicand
15 multiplier
625
125
$18.75 product

2. Jerry paid $1.19 for one bicycle tire. How much would two tires cost?

3. In a new job Jerry earned $5.50 a week. How much did he earn in 9 weeks? In 12 weeks?

4. After Jerry had earned some money, he bought 6 handkerchiefs for his mother. If he paid $1.50 for them, what would be the cost of one?

When the dividend is dollars and cents and the divisor is just a number, the quotient will be dollars and cents. Write the decimal point of the quotient exactly above the decimal point of the dividend. Write a dollar sign in front of the quotient.

$.25 quotient
divisor 6)$1.50 dividend
1.50

Multiply:

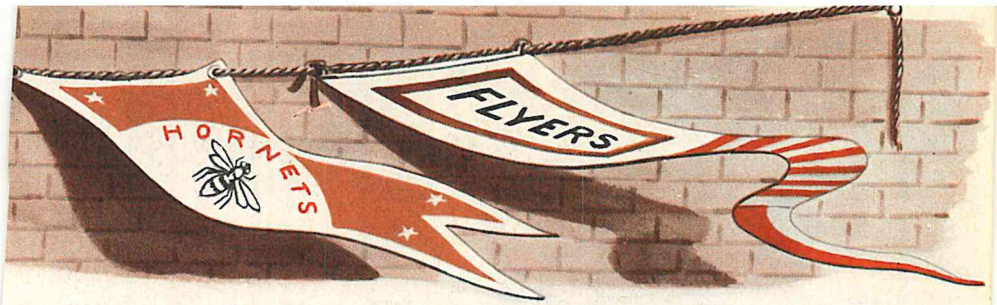
5. $45.12 by 35

6. $36.49 by 89

Divide:

7. $39.68 by 32

8. $73.47 by 31

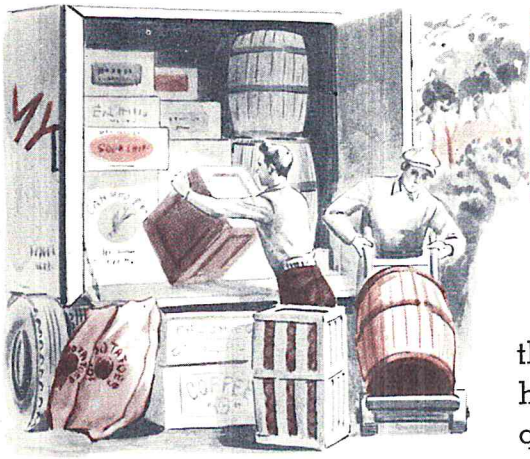


Pennant Races in Division

Choose your teams. After each race have someone work the divisions on the blackboard.

The divisions on this page have three figures in each quotient. Except for this, they are no harder than the divisions you have had before. Work hard for your team.

		a	b	c	d
R	1.	21)11466	31)22475	41)30586	51)40833
A	2.	61)44835	71)31098	81)35316	91)49868
C	3.	22)9570	32)13952	42)22344	52)23304
E	4.	62)39122	72)31464	82)46986	92)58524
I	5.	23)5382	33)14916	43)23005	53)34609
R	1.	63)53613	73)55188	83)37599	93)42501
A	2.	24)2952	34)14790	44)15576	54)11556
C	3.	64)29184	74)26108	84)44688	94)40984
E	4.	25)3075	35)11970	45)23085	55)23760
II	5.	65)35815	75)33975	85)30290	95)50825



Wholesale Buying

When your grocer buys things to sell in his store, he buys them in large quantities. This is called **wholesale buying.**

Here are some buying problems that a grocer might have to figure. See if you find them easy.

1. The grocer bought a case of 48 cans of tomato juice. If he paid $1.92 for the case, how much did he pay per can?

2. He paid $1.80 for a crate containing 90 oranges. What did each orange cost?

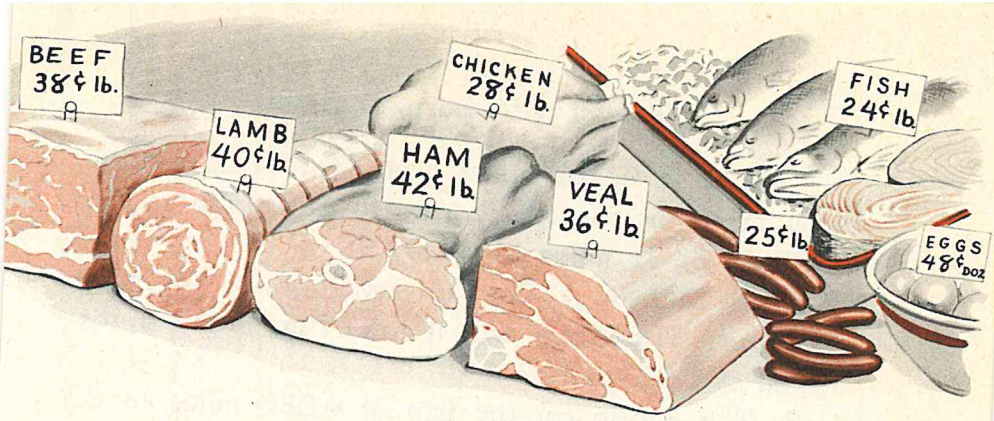
3. If he bought 450 lb. of new potatoes for $9.00, how much did he pay per pound?

4. If he paid $15.00 for 6 crates of grapefruit, how much did one crate cost him?

5. The grocer paid the farmer $.23 a dozen for 72 dozen eggs. How much did the farmer get for all the eggs?

6. What will the grocer pay for a 49-lb. sack of coffee at $.19 a pound? At $.23 a pound?

7. Yesterday the grocer bought $64.75 worth of vegetables. Today he bought $56.45 worth of vegetables. How much was his bill for the two days together?



Retail Buying

Persons like Mother and you buy in small quantities. This is called **retail buying.**

1. What will you pay for a 6-pound beef roast? (Hint: Write 38¢ using a decimal point and dollar sign.)

2. What will $\frac{1}{2}$ lb. of ham cost?

3. What will 3 lb. of frankfurters sell for?

4. What must Mother pay for $\frac{1}{4}$ dozen eggs? $\frac{3}{4}$ dozen?

5. What must you pay for 4 dozen eggs?

6. I bought a 6-pound lamb roast. What did it cost me? What change should I get back from a 5-dollar bill?

7. If I bought a pound of fish and $\frac{1}{2}$ dozen eggs, what would my bill be?

8. Mother bought 2 lb. of fish, a 3-pound chicken and $\frac{1}{2}$ dozen eggs. How much did she spend?

9. What will a 4-pound lamb roast cost? What will $\frac{1}{2}$ pound of lamb roast cost? What will a lamb roast that weighs $4\frac{1}{2}$ pounds cost?

Travel with Long Division

1. If it is 6,944 miles from Manila to Seattle, how many hours will it take to make the trip at the rate of 31 miles an hour?

2. A wild duck flies an average of 45 miles an hour. How long will it take him to fly a distance of 1,530 miles?

3. Tom made an air trip of 4,836 miles in 39 hours. What was the average speed per hour?

4. It is about 3,276 miles from Portland, Oregon, to Mexico City. At an average speed of 42 miles an hour, how many hours will it take to make the trip?

	a	b	c	d
5.	$26\overline{)3146}$	$36\overline{)14862}$	$46\overline{)19366}$	$56\overline{)19152}$
6.	$66\overline{)28776}$	$76\overline{)34276}$	$86\overline{)37496}$	$96\overline{)52416}$
7.	$27\overline{)5724}$	$37\overline{)8658}$	$47\overline{)15928}$	$57\overline{)19594}$
8.	$67\overline{)35644}$	$77\overline{)34804}$	$87\overline{)47154}$	$97\overline{)70295}$
9.	$28\overline{)5936}$	$38\overline{)11894}$	$48\overline{)15552}$	$58\overline{)23896}$
10.	$68\overline{)23256}$	$78\overline{)26910}$	$88\overline{)54000}$	$98\overline{)42728}$
11.	$39\overline{)8307}$	$49\overline{)10927}$	$59\overline{)24485}$	$69\overline{)29325}$
12.	$79\overline{)41396}$	$89\overline{)45657}$	$89\overline{)55625}$	$99\overline{)44649}$
13.	$68\overline{)22168}$	$79\overline{)48585}$	$57\overline{)23997}$	$97\overline{)62662}$
14.	$88\overline{)54912}$	$56\overline{)34608}$	$46\overline{)19550}$	$74\overline{)47878}$

More 3-Figure Quotients

Many quotient figures below, as you first find them, are not right. Whenever a quotient figure is too large, you will try the next smaller figure. For practice, it would be well for you to turn back to page 116. You should be able to test quotient figures in your mind. If you cannot test in your mind, write what you think as shown in the example.

1. Divide 17761 by 26.

683
26)17761
156
216
208
81
78
3

Finding First Quotient Figure

8 — 26)177 — 208

7 — 26)177 — 182

6 — 26)177 — 156 — 21

Finding Second Quotient Figure

10 — 26)216 — 26

9 — 26)216 — 234

8 — 26)216 — 208 — 8

Finding Third Quotient Figure

4 — 26)81 — 104

3 — 26)81 — 78

Check

683
26
4098
1366
17758
3
17761

Copy and divide. Check.

2. 26)23401 36)21776 46)34450 56)38809

3. 66)54401 76)28957 86)40884 96)65492

4. 24)18776 34)24486 44)42982 54)48066

5. 64)52460 74)64243 84)66882 94)72004

Using Long Division to Find Averages

1. If 22,100 copies of a boys' book are sold in a year, what is the average number of copies sold per week? (52 weeks in a year)

2. A store owner paid $12,045 in wages each month. If he had 73 workers, what was the average wage per month?

3. Helen's father owed $3,360. He arranged to pay the debt in 96 equal payments. What was the amount of each payment?

4. A train makes a trip of 2,205 miles at an average speed of 63 miles an hour. How many hours does it take to make the trip?

	a	b	c	d
5.	$78\overline{)24116}$	$45\overline{)32355}$	$41\overline{)15498}$	$77\overline{)48818}$
6.	$64\overline{)33792}$	$86\overline{)63124}$	$32\overline{)29600}$	$56\overline{)49000}$
7.	$64\overline{)24000}$	$74\overline{)24124}$	$86\overline{)37582}$	$93\overline{)22506}$
8.	$49\overline{)30821}$	$55\overline{)46585}$	$75\overline{)48600}$	$67\overline{)26264}$
9.	$35\overline{)30286}$	$65\overline{)28734}$	$85\overline{)65540}$	$75\overline{)38525}$
10.	$73\overline{)47654}$	$93\overline{)81635}$	$53\overline{)29874}$	$33\overline{)18560}$
11.	$42\overline{)38651}$	$62\overline{)55460}$	$82\overline{)72465}$	$32\overline{)10432}$
12.	$57\overline{)46740}$	$97\overline{)85570}$	$37\overline{)28654}$	$77\overline{)38976}$
13.	$28\overline{)13678}$	$68\overline{)73654}$	$48\overline{)39806}$	$88\overline{)19732}$
14.	$59\overline{)38876}$	$79\overline{)60893}$	$39\overline{)13969}$	$69\overline{)57699}$

Bring Your Basket to This Sale

Potatoes	10 Lb. 25¢
Yellow Corn	4 Ears 10¢
Apples	5 Lb. 25¢
Crisp Celery	2 Stalks 11¢
Fresh Peas	2 Lb. 29¢
Onions	3 Lb. 10¢
Milk	3 Cans for 22¢
Soup	4 Cans for 25¢
Pears	2 Cans for 45¢
Peaches	2 Cans for 39¢

This grocer has a sale. The "ad" gives you the price of more than one of each of the things advertised. Can you find the cost of the foods below as you put them in your basket? **No pencils.**

1. Find the cost of 12 ears of corn. Look at the price given in the "ad."

2. What will you pay for 15 pounds of apples?

3. How much will 9 cans of milk cost?

4. Buy 4 stalks of celery. Find the cost.

5. Put 16 cans of soup in your basket. How much will this cost? That is too heavy to carry. Take just 8 cans. Now what does the soup cost?

6. Mother wants 4 cans of peaches. What will you pay for them?

7. Do you like onions? Well, buy 6 pounds for Mother. She will use them in cooking. How much did you pay for them?

8. Mother shopped at the dry goods store while you were at this sale. She bought buttons at 3 cards for 10¢. How much did she pay for 6 cards?

9. She bought some lace at 4 yards for 25¢. What did she pay for 8 yards?

10. She bought some neckties at 3 for $1.00. How much did she pay for 6 neckties?

A Picture of How Well You Do

There are two sets of examples on this page with 8 examples in each set. At the bottom of this page are two pictures, called graphs, showing how well Tommy did when he worked the sets of examples. There are 8 squares in each graph, one square for each example in a set. Tommy colored a square for each example he worked right.

1. How many examples did Tommy get right in Set I? In Set II?

2. Draw two rows of 8 squares each, as shown below, but do not color them now. As you do each set of examples below, color a row of squares to show how many examples you had right.

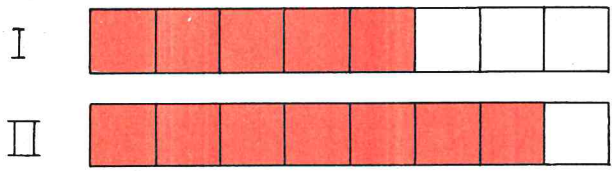
Set I. Multiply:

87	92	26	367	149	257	436	583
3	54	75	25	48	34	72	294

Set II. Divide:

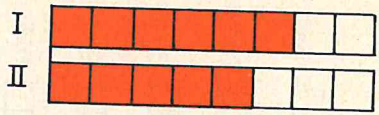
$70\overline{)280}$	$54\overline{)17{,}280}$	$300\overline{)52{,}800}$	$42\overline{)2{,}056}$
$91\overline{)\$290.29}$	$57\overline{)\$186.96}$	$15\overline{)\$143.85}$	$37\overline{)\$58.83}$

Graphs of Tommy's Scores

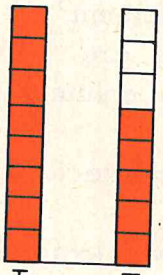


More About Graphs

Grace made her rows of squares one above the other. When it came time to color, she marked as many as needed to be colored and colored them all at once instead of one square at a time. We call a row of squares a bar, and we call a picture of scores, as Grace made, a bar graph.



Grace's Scores



Helen's Scores

1. How many examples did Grace get right in Set I? Set II?

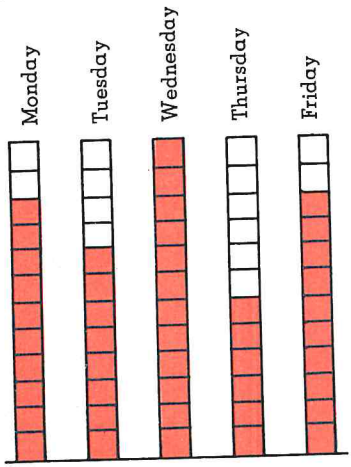
Helen made her rows of squares to stand up and down. She then colored them, as Grace did, to show how many in each set she got right.

2. How many examples did Helen get right in Set I? In Set II?

3. Make six graphs as Grace did, but do not color them as she did. Color these graphs to show the scores made by the pupils below.

	Mary	Jane	Harry	George	Frank	Susan
Set I	7	8	6	4	5	3
Set II	8	6	5	7	4	5

4. Make six graphs as Helen did, but do not color them as she did. Color these graphs to show the scores made by the pupils in example 3.



Henry's Scores

Picture of Henry's Work for a Week

1. Henry kept a graph of his arithmetic examples for one week. How can you tell this is a graph of a week's work?

2. Henry had 12 examples each day. How many squares should he draw in a column?

3. There are five school days in a week. How many columns of squares should Henry draw?

4. On which two days did he have exactly the same number of examples right?

5. On which day did he have the fewest examples right? How many did he get correct?

6. What day did he have 100%, or all, of his examples worked correctly?

7. Henry had 20 spelling words each day, and he had spelling on Monday, Tuesday, Wednesday, Thursday, and Friday. How many squares will he need to put in each column? How many columns will he need to make?

8. Draw a graph for Henry. Color it to show that he had 14 words right on Monday, 17 on Tuesday, 12 on Wednesday, 18 on Thursday, and 20 on Friday.

Problems with Something Missing

Each problem below has some fact missing. Decide what fact is missing, put it in, and then solve the problem.

1. Jack has a fine electric train. He has 25 lengths of track. How much did the track cost?

2. Jack bought some lamp posts. He paid $1.25 for each lamp post. How much did he pay for all?

3. Jack paid $1.75 for his water tank. How much money did he have left?

4. He paid $1.50 for some tank cars. What did each tank car cost?

5. Jack bought a signal tower for $3.75. Then he saw a warning signal and bought it, too. How much did he pay for both?

6. The track was too long. Jack took 5 lengths out of the track he had made. How many lengths were then in the track?

7. Father gave Jack $5.00 to spend for new things for his train set. Jack bought a bridge and a tunnel. How much money did he have left?

A Contest with the Clock

Try to Beat the Clock—Addition

Use folded paper and write the sums quickly

Time: 6 minutes. Don't let the clock win!

	a	b	c	d	e
1.	548	902	58	215	4
	35	129	98	34	80
	927	890	514	981	239
	54	7	39	103	569
	399	873	493	400	124
2.	67	392	144	36	429
	827	55	5	1	302
	5	402	868	498	14
	548	908	132	537	66
	659	41	200	394	238
3.	650	239	592	438	982
	29	125	365	238	374
	336	392	309	74	300
	670	383	153	388	293
	5	27	133	428	347
		1166	1532	1666	2296

Check your work by putting sums on the blackboard. Try this page every few days. You should be able to get all the sums correct in 10 minutes.

What Questions Should These Problems Ask?

1. Nine boys formed a softball team. Each boy paid 75¢ club dues. What question should this problem ask?

2. Tom was captain. He paid $1.10 for 5 softballs. Question?

3. He bought 2 gloves. He paid $1.59 for one and $1.75 for the other. Question?

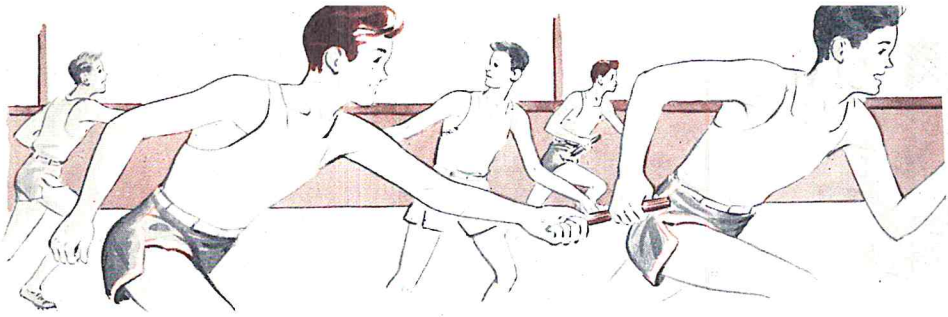
4. Softball bats were selling for $.39 each. Tom bought 4 bats. Question?

5. The first time the boys played, 124 boys and 45 girls came to see the game. Question?

6. Some girls sold lemonade at the game. Fifty-seven children bought lemonade at 5¢ a glass. Question?

7. The boys on the team wanted uniforms. A uniform cost $2.98. There were 9 boys on the team. Question?

8. That season the boys played 14 games. They lost 5 games. Question?



A Contest with the Clock

Try to Beat the Clock—Subtraction

Use folded paper and write the remainders quickly. Time: 10 minutes. Don't waste a single tick of the clock.

	a	b	c	d	e
1.	5827	2837	1009	4290	3982
	482	1328	909	1236	3237
2.	4029	3899	2039	3826	1315
	2399	1236	890	3815	938
3.	6038	3988	5223	4291	3982
	989	1230	3181	3437	67
4.	2000	3892	9213	5253	6725
	7	627	9204	178	982
5.	2538	9365	8378	2900	3346
	2000	3798	399	143	3254

Check your work.

Try this page every few days until you can get 20 or more of these examples subtracted correctly in 10 minutes.

Do Not Use Your Pencil

You will not always have a pencil handy when you meet problems in daily life, and so it is wise to practice getting answers without the help of a pencil.

1. If apples are sold at 3 for 10¢, what will 6 apples cost?

2. I earned 25¢ an hour. What did I earn in 4 hours?

3. I spent $.40 from a dollar bill. What did I have left?

4. Tomato soup sells at 4 cans for 29¢. What must I pay for 8 cans?

5. Cheese is $.60 a pound. What will $\frac{1}{4}$ lb. cost?

6. Jane practiced $\frac{1}{2}$ hour. How many minutes was this?

7. Father bought a dozen oranges for $.48. What did each orange cost?

8. Jack is 60 inches tall. How many feet tall is he?

9. Mr. Brown earns $2 an hour. If he earned $14 in all, how many hours did he work?

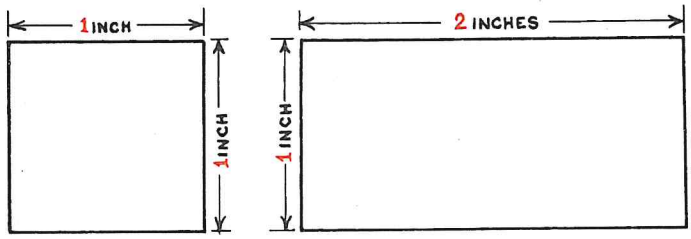
10. Mother divided 24 pieces of candy among her 4 children. How many did each receive?

11. A book had 224 pages in it. If Mary reads 7 pages each day, how many days will it take for her to read the book?

12. A camping trip cost $98. Four men share the expenses equally. How much should each pay?

Squares and Rectangles

Each of the figures below has four "square" corners. **Right angle** is another name for a **square corner.**



1. Look carefully at the figures above. How are they alike and how are they different?
2. Are all the corners of a square right angles?
3. Are all the corners of a rectangle right angles?
4. Look at things in the room. Find as many square corners or right angles as you can.
5. Are all the sides of a square equal?
6. Are all the sides of a rectangle equal?
7. Tell which of the following are squares and which are rectangles.

handkerchief	window pane	door to house
dollar bill	table cloth	book
chocolate bar	sheet of paper	envelope

The **distance around** a square or rectangle is called the **perimeter.** The word perimeter comes from two Greek words: **peri,** which means around, and **meter,** which means to measure.

Distance Around, or Perimeter

A baseball diamond looks diamond-shaped to someone sitting in the grandstand. If you were up in a plane looking down on a baseball diamond, you would see it as it really is. The "diamond" is a **square** 90 feet on each side. Figure A shows how it would look from an airplane.

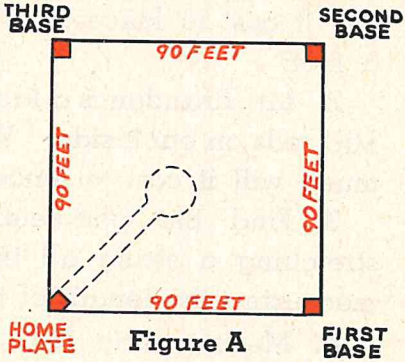


Figure A

Put your finger on the home plate. Play you have hit the ball and are making a home run. Have your finger "run around the bases." This is the distance around, or the perimeter of the square.

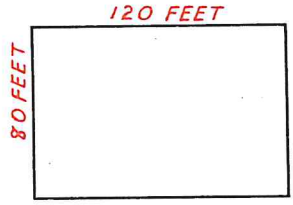
1. Find the perimeter of the square shown in Figure A.

2. How many feet does a baseball player run when he makes a home run?

3. Grandfather put a fence around his vegetable garden. The garden is a square 50 feet on a side. Draw a figure. How many feet of fencing should he buy?

Finding Perimeters of Squares and Rectangles

The perimeter of a square or rectangle is the sum of the lengths of the four sides. Drawing a figure may help one to understand a problem. The figure will help you understand Problem 1.



1. Mr. Cullin lives in town. The lot on which his house stands is 80 ft. wide and 120 ft. long. What is the perimeter of his lot? How much will it cost to fence it at 18¢ a foot?

2. Mr. Brandon is a farmer. His farm is a square, 160 rods on each side. What is its perimeter? How much will it cost to fence it at 46¢ a rod?

3. Find the perimeter of your classroom by stretching a string all the way around, and then measuring the length of the string.

4. Measure the four sides of your classroom. Add the measurements together. Did you get the same answer as you did in example 3?

5. Find the perimeter of your notebook cover.

6. Find the perimeter of your desk top.

7. A little park is 350 feet on each side. How many feet would you walk in going around this park?

8. Jane ran around the swimming pool at the playground. If the pool is 30 feet long and 24 feet wide, how many feet did she run?

Make Graphs of Your Scores

1. Draw 3 rows of 6 squares each. Your graph form should look like this:

Test I						
Test II						
Test III						

2. After each test below, color the graph to show your score.

Test I

1. Add: 2473, 4098, 2938, 3480, 1224 — 14,213

2. Subtract: 5000 − 3562 — 1438

3. Multiply: 298 × 284

4. Subtract: $4.58 − .34

5. Multiply 483 by 520. 251,160

6. $6.82 divided by 31 = 22

Test II

1. Add: 4273, 4983, 2003, 1671, 4283 — 17,213

2. Subtract: 9000 − 2930 — 6,070

3. Multiply: 205 × 458 — 93,890

4. Subtract: $5.98 − 3.00

5. Multiply 400 by 457.

6. 1088 ÷ 34 = 32

Test III

1. Add: 4009, 3928, 1528, 5277, 4293 — 19,035

2. Subtract: 5930 − 509 — 5,421

3. Multiply: $45.23 × 42

4. Subtract: $186.79 − 79.85 — 106.94

5. 9100 ÷ 67 =

6. 58)4292 — 74

Drawing to Scale

Fifth-grade pupils of the Lincoln School are planting gardens. The pupil with the best garden will receive a fine set of garden tools as a prize.

Billy said, "First we must make a plan."

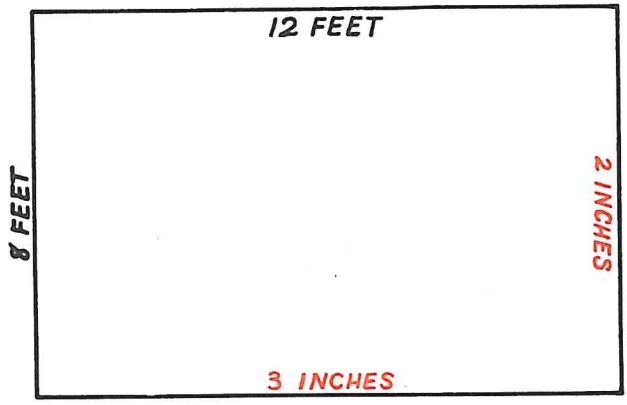
"My garden will be 12 feet long and 8 feet wide," said Sue. "I can't draw such long distances on paper. The paper isn't big enough."

Billy laughed. He had drawn airplane plans.

This is the way he explained scale drawing.

First, you must let 1 inch on your ruler stand for a certain number of feet. Because 4 is contained evenly in 12 feet and evenly in 8 feet, we can let 1 inch on the ruler stand for 4 feet on the side of your garden. The scale of the drawing of your garden would be 1 inch stands for 4 feet.

There are three 4's in 12, and two 4's in 8. On the drawing, your garden would be 3 inches long and 2 inches wide. One inch on the drawing stands for four feet. This is called drawing to scale.



1. Jane's garden is 9 feet by 12 feet. Make a scale drawing for her so that 1 inch on the drawing will stand for 3 feet on the actual garden.

Using Different Scales

1. John will let 1 inch stand for 5 feet. If he wishes to show a line 20 feet long, how many inches long will he draw the line? How many inches long will he draw a line to show 15 feet?

2. Draw a garden 15 feet by 20 feet using a scale of 1 inch standing for 5 feet.

3. Draw a garden 6 feet wide and 9 feet long, using a scale of 1 inch standing for 3 feet.

4. What scale would you use to draw a garden 12 feet wide and 15 feet long? Draw the garden to this scale.

5. Mr. Taft is planning to build a garage 15 feet by 18 feet. Make a drawing for him to the scale of 1 inch for 3 feet.

6. Joe's schoolroom is 24 feet by 30 feet. Choose a scale and make a drawing.

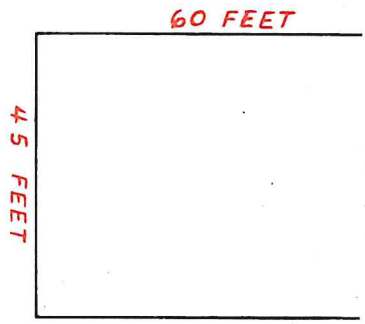
7. Measure the width and the length of your classroom. Decide upon a suitable scale, and make a drawing.

8. Sally has a backyard garden planted in flowers and vegetables. The real garden is 20 feet by 50 feet. She has made a drawing to the scale of "1 inch stands for 20 feet."

Use your ruler to test if Sally has drawn her garden correctly.

Measurement Review

1. Mr. Smith has a lot 45 feet wide and 60 feet long. In this drawing of the lot 1 inch stands for 30 feet. What will $\frac{1}{2}$ inch stand for?



2. The lot is 45 feet wide. How wide should this drawing be? Measure and see if the drawing is right.

3. The lot is 60 feet long. How many inches long should the drawing be? See if the drawing here is correct.

4. What is the perimeter of Mr. Smith's lot?

5. What will it cost to put a fence all around it at $.27 a foot?

6. Edwin has a garden 8 feet wide and 10 feet long. Make a drawing of the garden using the scale "1 inch = 4 feet."

How wide will your drawing be? How long?

7. Page 183 told you that a baseball diamond is really a 90-foot square. Draw a baseball diamond using the scale "1 inch = 30 feet."

8. Find the perimeter of a garden which is a square 16 feet on a side. Make a scale drawing of the garden.

9. A fence around a square garden measures 60 feet. How long is the garden on one side?

Hint: How many equal sides does a square have?

First Call to the Rifle Range

Keep your eye on the decimal point. The decimal point is an important target on this page. Mark your papers after each section.

Section I

1. Add \$41.28, \$.36, \$5.98, and \$.02.
2. \$24.01 + \$.40 + 73¢ + 95¢ + \$9.25 + \$1.23 =
3. Find the sum of \$12,534.00 and \$42.31.
4. Add \$4, \$3.29, 5¢, 45¢, \$3.75, and 95¢.
5. \$4 + \$4.23 + \$53.29 + \$.02 + \$.48 =

Section II

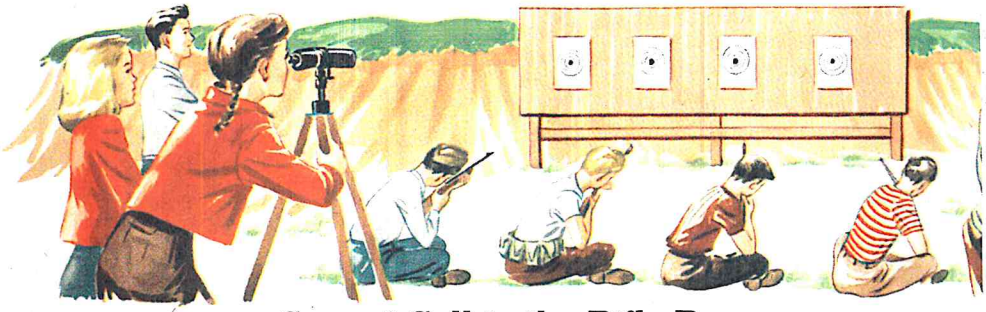
6. Subtract \$7.72 from \$42.00.
7. Take \$1.02 from \$5.
8. Find the difference between \$75.25 and \$2.38.
9. \$.74 − 45¢ =
10. \$2000 − \$.35 =

Section III

11.	12.	13.	14.	15.	16.
\$293.00	\$34.20	\$675.12	\$5.39	\$90.00	\$.24
×31	×713	×46	×36	×5	×437

You had 16 chances to make hits on this page. If you made as many as 14 hits, try page 191.

If you missed more than 2 targets, page 190 is just what you need.



Second Call to the Rifle Range

Notice the different ways in which dollars and cents are written in these examples.

Work examples 1–6 on the blackboard to see if you work them correctly.

1. $8.32 + 76¢ + $2 = ?
2. $14 − 24¢ = ?
3. $24.75 − $7 = ?
4. $25 ÷ 4 = ?
5. 75¢ × 27 = ?
6. $11 − $9.35 = ?

Copy and find the answers to these examples:

7. $4.69 + $4 + 45¢ + $1.24 + $65.20
8. $.25 + $253.19 + $34 + 58¢ + $253.35
9. $45 − 67¢
10. $13.52 − $5
11. $45.89 × 23
12. $.56 × 124
13. $674.42 × 365
14. $\frac{1}{4}$ of $6.40
15. $\frac{1}{3}$ of $125.34
16. $72 ÷ 5
17. $58.75 + 25¢
18. $72.64 + $.32
19. $40 − $12.30
20. $257.30 + $456
21. $254.38 × 53
22. $32 + 87¢
23. $7 + $.23 + $3.49
24. $23.00 × 54
25. $\frac{1}{8}$ of $36
26. $1.80 ÷ 4
27. 47¢ × 63
28. 98¢ × 24
29. 84¢ × 126
30. $78.85 ÷ 95

Sharpshooter Specials

Work for a Furniture Store Committee:

1. Make cut-outs of furniture from newspapers and magazines. Put a reasonable price on each piece of furniture. Arrange furniture as in a store. Have the pupils come to the store and make up problems like these:

a. Find the cost of the furniture needed in a living room.

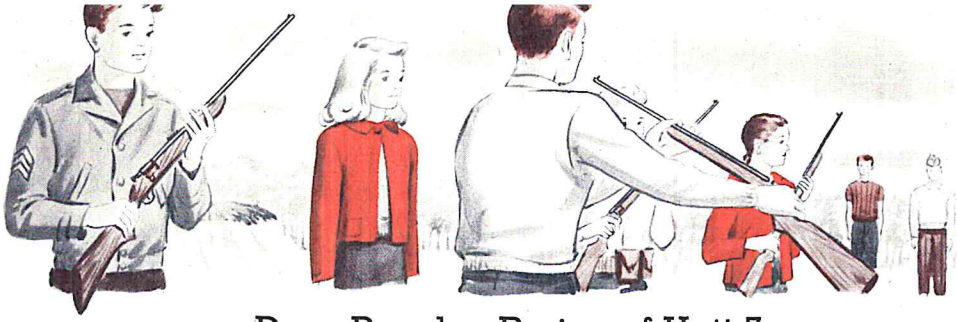
b. Mark certain pieces for "Special Sale." Find the saving by buying at special sale rather than at regular price.

c. Buy new furniture and turn in old furniture as part payment.

2. Look at the scale of miles for the map drawn below. Explain how this scale is used in finding distances on the map. If you have trouble, your teacher will help you.

3. If two cities are $\frac{1}{2}$ in. apart on the map, how many miles apart are the two cities?

4. Use your ruler and the scale of miles to find the number of miles between these cities:



Dress Parade—Review of Unit 7

1. John had \$4.75 in his toy bank. He put in 45¢ more this morning. How much is in his bank now?

2. Mother had \$48 in her purse. She paid the rent, which was \$37.50. How much has she left?

3. Father earns \$49.50 a week. How much will he earn in a year (52 weeks)?

4. Aunt Mary gave Jack \$1.60. She gave Jane $\frac{1}{2}$ as much. How much did she give to Jane?

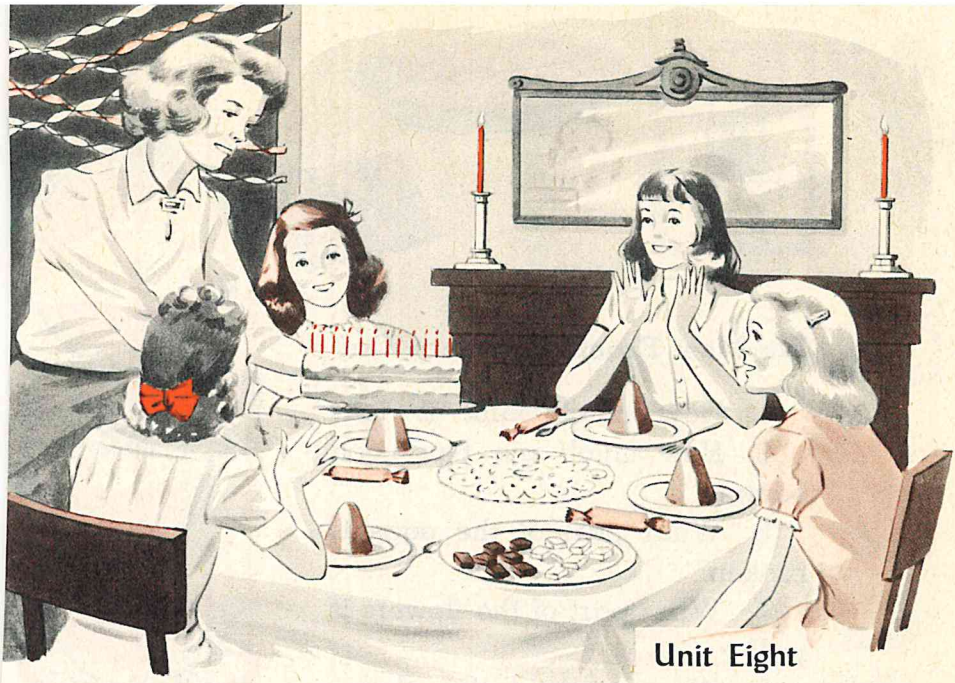
5. Mother had \$452.56 in the bank. She put in \$45.00 today. How much does she now have?

6. Tommy got a chance to deliver for the druggist. If he earns 25¢ an hour, how much will he earn in 8 hours?

7. Mother bought 6 dining room chairs. If one chair cost \$8.95, what did she pay for all of them?

8. John made 45¢ Monday, \$1 Tuesday, \$1.35 Wednesday, a quarter on Thursday, and a half dollar on Friday. How much did he earn in all?

9. Mary paid \$1.95 for a sweater, \$3.75 for a pair of shoes, \$1.98 for a hat, and \$5.95 for a skirt. How much did these clothes cost her?



Fractions Go to a Party

1. At a birthday party Mother divided the ice cream into 4 equal parts. What is each part called?

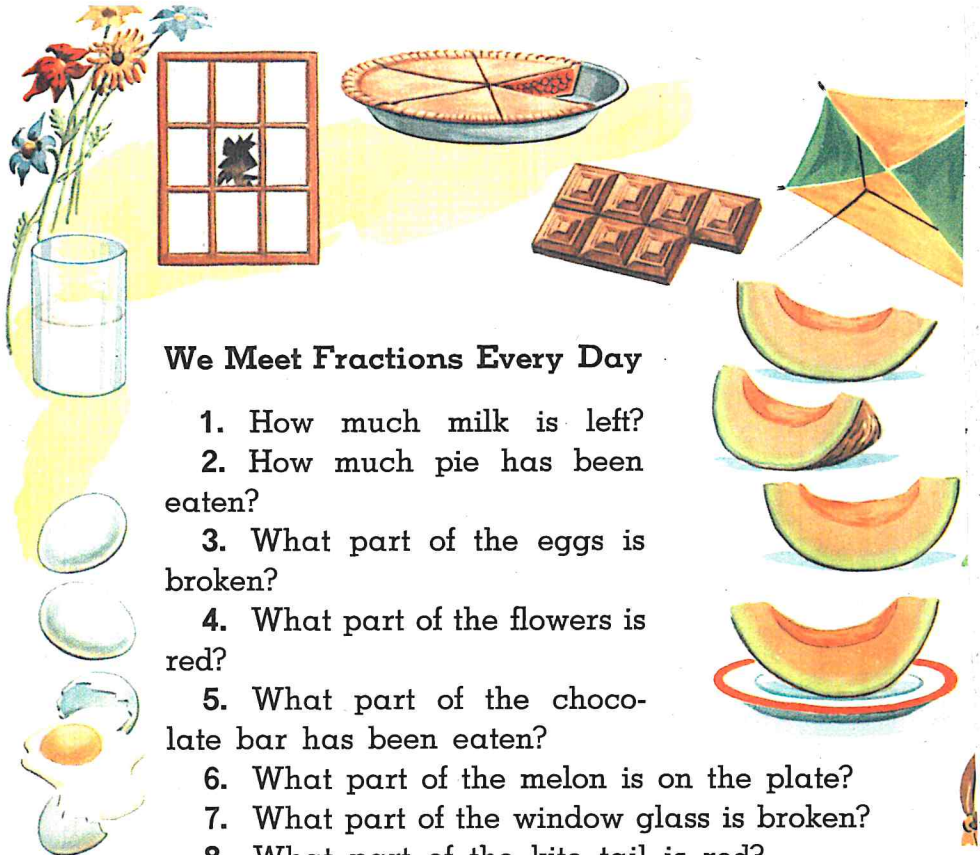
When something is cut or divided into 4 equal parts, each of the equal parts is called one-fourth. You write one-fourth in figures as $\frac{1}{4}$.

2. The girls cut the cake into 5 equal parts. What is each part called?

When something is divided into 5 equal parts, each part is called one-fifth, or $\frac{1}{5}$.

3. What part of the candy is white? You write one-half in figures as $\frac{1}{2}$.

One or more of the equal parts into which a whole may be divided is called a fraction.



We Meet Fractions Every Day

1. How much milk is left?

2. How much pie has been eaten?

3. What part of the eggs is broken?

4. What part of the flowers is red?

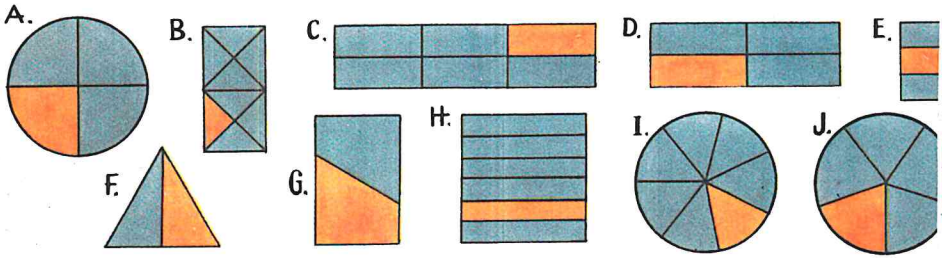
5. What part of the chocolate bar has been eaten?

6. What part of the melon is on the plate?

7. What part of the window glass is broken?

8. What part of the kite tail is red?

Look at these wholes divided into equal parts.



9. Write the letters A through J. After each letter, write the fraction which shows how much of each whole is colored orange.

A Fraction Tells Two Things

Circle A has been divided into 5 equal parts. One of the equal parts has been colored red. One-fifth of the circle has been colored red.

The fraction $\frac{1}{5}$ tells us two things:

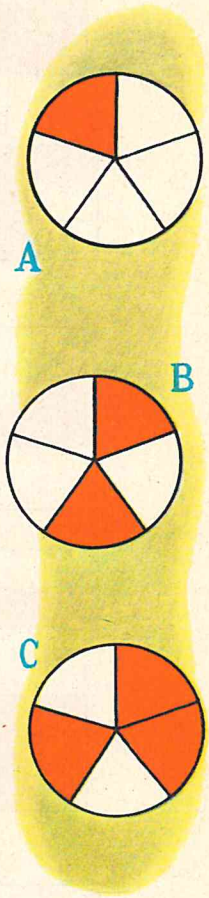
The number above the line tells us 1 part has been colored.

The number below the line tells us the circle is divided into 5 equal parts.

The number above the line is called the **numerator.** The number below the line is called the **denominator.**

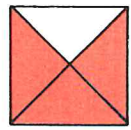
1. Look at circle B. Into how many equal parts has it been divided? How many of these equal parts have been colored red? Write as a fraction the part of the whole that is colored red. What is the numerator, and what does the numerator tell? What is the denominator, and what does it tell?

2. Look at circle C. Write as a fraction the part of the whole that is colored red. What is the numerator, and what does the numerator tell? What is the denominator, and what does the denominator tell?

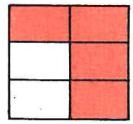


The Terms of a Fraction

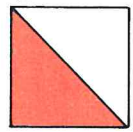
A



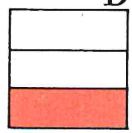
B



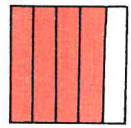
C



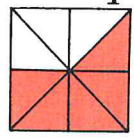
D



E



F



1. Look at square A. Into how many equal parts is it divided? How many of the parts are white? How many are red? Write as a fraction the part of the whole square that is white. Write as a fraction the part of the whole square that is red.

2. Do the same for squares B, C, D, E, and F as you did for square A.

The denominator of a fraction is the number below the line. It tells the number of equal parts into which the whole is divided.

The numerator of a fraction is the number above the line. It tells the number of equal parts that are taken.

The numerator and the denominator are called the terms of a fraction.

3. Estelle cut a cake into 8 equal parts. She gave 3 pieces to her friends. What part of the cake did she give to her friends? Draw a figure.

4. Estelle put 5 pieces of her cake in the cake box. What part of the cake did she put in the cake box?

Fraction Fun

1. Choose a captain who can write numbers neatly. He will write these fractions on the blackboard:

$\frac{3}{5}$ $\frac{7}{8}$ $\frac{3}{4}$ $\frac{2}{3}$ $\frac{5}{8}$ $\frac{1}{2}$ $\frac{7}{9}$ $\frac{2}{5}$ $\frac{7}{10}$

The captain will point to a fraction and call a pupil's name. The pupil called will (a) read the fraction; (b) tell the numerator; (c) tell the denominator.

2. Choose another captain to write these fractions on the blackboard:

$\frac{1}{3}$ $\frac{5}{6}$ $\frac{1}{4}$ $\frac{3}{8}$ $\frac{1}{8}$ $\frac{3}{5}$ $\frac{1}{5}$ $\frac{3}{10}$ $\frac{5}{9}$

The captain will point to a fraction and call a pupil's name, and the pupil will answer exactly as in 1 above.

3. Let each pupil choose one of the fractions above and make something to show the meaning of the fraction.

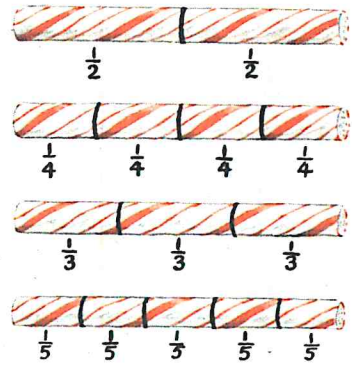
(Suggestion: Draw, fold, or cut circles, squares, rectangles, and other figures.)

The class will be judges to decide which pupil showed the meaning of his fraction best.

4. Each pupil will draw on a piece of paper 9 inches wide and 12 inches long. Draw a circle first. Make the circle 8 inches all the way across.

Choose one of the fractions in 1 or 2 above. Divide your circle into parts and color the parts so as to show the meaning of the fraction you have chosen. Be careful and neat in your work.

Parts that Make Up a Whole



A stick of candy is broken into halves. Two halves make one whole. $\frac{2}{2} = 1$, where 1 means the whole.

A stick of candy is broken into fourths. Four fourths make one whole. $\frac{4}{4} = 1$, where 1 means the whole.

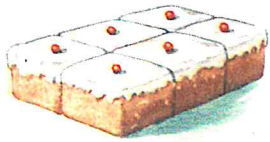
1. How many thirds are in a whole?
2. How many fifths are in a whole?
3. Say the number that belongs in place of each $*$.

$$\frac{*}{3} = 1 \qquad \frac{*}{5} = 1 \qquad \frac{*}{6} = 1 \qquad \frac{*}{8} = 1$$

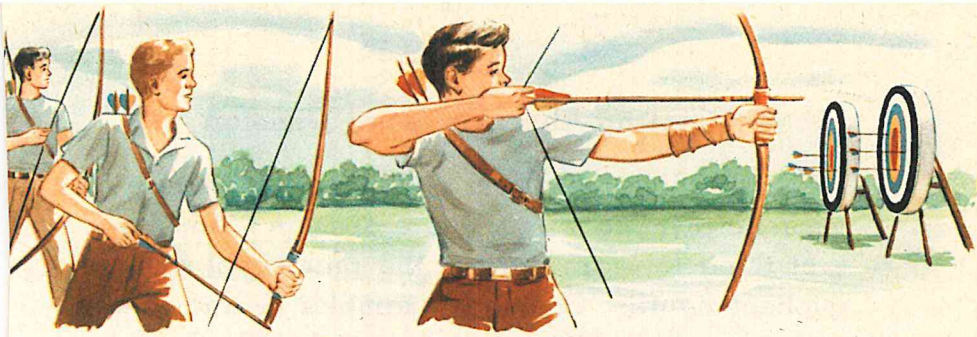
Each of the following is equal to a whole. Say the missing word.

4. $*$ halves $*$ sixths $*$ eighths
5. $*$ fifths $*$ ninths $*$ sevenths
6. $*$ thirds $*$ fourths $*$ tenths

7. Which is more, two-fourths of a stick of candy or one-half of a stick of candy? Prove your answer by looking at the pictures.



8. Which is more, three-sixths of a loaf cake or one-half of the same cake? Prove your answer.



Contest in Mixed Practice

Choose a captain for each row of pupils. After each section, have captains work the examples correctly on the blackboard. The row having the largest number of perfect papers wins.

Section I. Add. Check by adding in the opposite direction.

1. 58,216 + 2,108 + 432,178 + 7,345 + 29,476 = 529,323

2. 6,146 + 46,632 + 6,879 + 457,179 + 39,904 = 556,740

3. $138.16 + 4.97 + 500.25 + 38.75 + 145.92 = $828.05

4. $479.10 + 145.08 + 38.16 + 7.93 + 449.54 = $1119.81

Section II. Subtract:

5. 147,287 − 78,349 = 68,938

6. 93,650 − 26,561 = 67,089

7. $163.60 − 38.75 = $124.85

8. $85.15 − 27.25 = $57.90

9. 678 from 1142

10. 4,325 from 7,017

11. $75.19 from $100

12. $338.28 from $2,104.90

Section III. Multiply:

13. 485 × 20

14. 764 × 56 = 42,784

15. 934 × 66

16. 85,205 × 24

Section IV. Divide:

17. 6)27349

18. 43)3354

19. 81)5022 = 62

20. 76)18438

21. 12)1728 = 144

199

Getting Ahead in Long Division

It is an easy step from dividing with 2-figure divisors to dividing with 3-figure divisors. The important thing to learn here is the placing of the first quotient figure. Compare examples A and B and notice how the quotient figures are placed. Compare examples C and D.

A. $21\overline{)420}$ $\begin{array}{r} 20 \\ 42 \\ \hline 0 \end{array}$

B. $210\overline{)4200}$ $\begin{array}{r} 20 \\ 420 \\ \hline 0 \end{array}$

C. $71\overline{)2130}$ $\begin{array}{r} 30 \\ 213 \\ \hline 0 \end{array}$

D. $710\overline{)21300}$ $\begin{array}{r} 30 \\ 2130 \\ \hline 0 \end{array}$

Mark your papers after each set below.

Set I. Divide and check.

1. $310\overline{)6200}$ $410\overline{)12300}$ $610\overline{)24400}$ $810\overline{)16200}$
2. $520\overline{)15600}$ $720\overline{)28800}$ $920\overline{)18400}$ $220\overline{)8800}$
3. $430\overline{)8711}$ $630\overline{)19121}$ $830\overline{)33456}$ $930\overline{)46784}$

Set II. Divide and check.

4. $540\overline{)21753}$ $240\overline{)9686}$ $840\overline{)58992}$ $340\overline{)20604}$
5. $711\overline{)28451}$ $213\overline{)12795}$ $512\overline{)15415}$ $916\overline{)36703}$
6. $624\overline{)37356}$ $825\overline{)37225}$ $328\overline{)19698}$ $427\overline{)21462}$

Set III. Divide and check.

7. $732\overline{)29400}$ $334\overline{)26748}$ $539\overline{)21607}$ $235\overline{)14126}$
8. $443\overline{)26605}$ $642\overline{)32156}$ $744\overline{)67000}$ $941\overline{)56518}$
9. $460\overline{)10580}$ $550\overline{)17600}$ $670\overline{)27470}$ $880\overline{)54560}$

Pennant Races with Three-Figure Divisors

Choose your teams. After each race have the work done correctly on the blackboard. Mark your papers after each race. The team with the larger number of perfect papers wins. Help your team to win.

Race I. Divide and check.

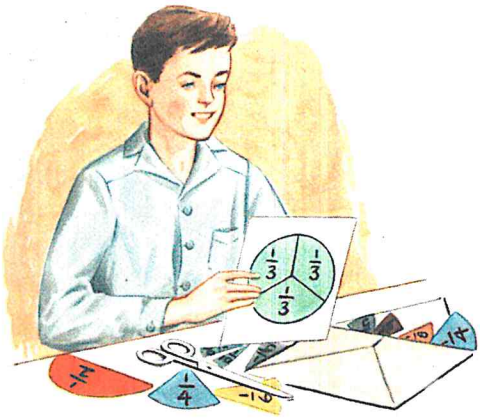
1. $210\overline{)8400}$ $320\overline{)12800}$ $530\overline{)26500}$ $740\overline{)44400}$
2. $312\overline{)24960}$ $624\overline{)31200}$ $831\overline{)58170}$ $545\overline{)27250}$
3. $469\overline{)14070}$ $784\overline{)31360}$ $892\overline{)26760}$ $573\overline{)34380}$

Race II. Divide and check.

1. $690\overline{)20700}$ $870\overline{)43500}$ $580\overline{)17400}$ $460\overline{)27600}$
2. $510\overline{)31620}$ $630\overline{)34020}$ $740\overline{)26640}$ $920\overline{)41400}$
3. $290\overline{)8990}$ $370\overline{)15910}$ $780\overline{)63960}$ $960\overline{)48960}$

Race III. Divide and check.

1. $631\overline{)15560}$ $742\overline{)24700}$ $523\overline{)21700}$ $819\overline{)44000}$
2. $205\overline{)8913}$ $309\overline{)16200}$ $403\overline{)29519}$ $508\overline{)32778}$
3. $116\overline{)2784}$ $132\overline{)4416}$ $124\overline{)7688}$ $163\overline{)6856}$



An Outfit for Measuring Fractions

On this page you will learn to make an outfit for comparing fractions, and on page 203 you will learn to use it.

1. Draw 16 circles on heavy paper. Make each 3 inches across at the center.

2. Color two circles red and mark them into halves. Cut one into halves.

3. Color two circles blue and mark them into fourths. Cut one into fourths.

4. Color two circles orange and mark them into eighths. Cut one into eighths.

5. Color two circles green and mark them into thirds. Cut one into thirds.

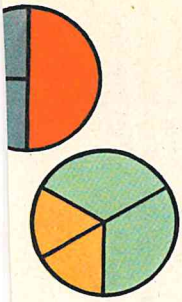
6. Color two circles yellow and mark them into sixths. Cut one into sixths.

7. Color two circles brown and mark them into ninths. Cut one into ninths.

8. Color two circles purple and mark them into fifths. Cut one into fifths.

9. Color two circles gray and mark them into tenths. Cut one into tenths.

You will need an envelope to keep your measuring outfit from getting lost. You can make one from a sheet of 9″ x 12″ heavy paper.



Using the Measuring Outfit

1. Place blue fourths on the red circle until one-half of the red circle is covered. How many blue fourths does it take? Explain how this tells us that $\frac{2}{4}=\frac{1}{2}$.

2. Place yellow sixths on your green circle until one-third of the green circle is covered. How many yellow sixths does it take? Explain how this tells us that $\frac{2}{6}=\frac{1}{3}$.

3. How many brown ninths make $\frac{1}{3}$?

Use your outfit to show that:

4. $\frac{3}{6}=\frac{1}{2}$ $\quad\frac{2}{8}=\frac{1}{4}$ $\quad\frac{2}{10}=\frac{1}{5}$

5. $\frac{3}{4}=\frac{6}{8}$ $\quad\frac{2}{4}=\frac{1}{2}$ $\quad\frac{8}{10}=\frac{4}{5}$

6. $\frac{1}{3}=\frac{2}{6}$ $\quad\frac{1}{5}=\frac{2}{10}$ $\quad\frac{1}{2}=\frac{2}{4}$

7. $\frac{2}{3}=\frac{6}{9}$ $\quad\frac{1}{3}=\frac{3}{9}$ $\quad\frac{2}{3}=\frac{4}{6}$

8. 1 whole = 5 fifths $\quad$ 1 whole = 4 fourths

9. $\frac{3}{3}=1$ whole $\quad\frac{10}{10}=1$ whole

10. $\frac{2}{2}=1$ $\quad\frac{6}{6}=1$

Use your outfit to find the missing numbers:

11. $\frac{1}{3}=\frac{?}{6}$ $\quad\frac{4}{5}=\frac{?}{10}$ $\quad\frac{1}{2}=\frac{?}{4}$

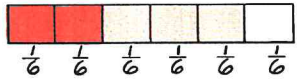
12. $\frac{3}{4}=\frac{?}{8}$ $\quad\frac{1}{2}=\frac{?}{6}$ $\quad\frac{2}{3}=\frac{?}{9}$

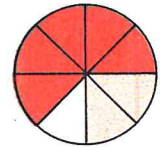
13. $\frac{1}{5}=\frac{?}{10}$ $\quad\frac{2}{3}=\frac{?}{6}$ $\quad\frac{1}{4}=\frac{?}{8}$

For Your Notebook

1. Draw a clock face showing 6 o'clock. How do the hands divide the clock face?

2. Draw three drinking glasses. Show one as $\frac{1}{2}$ full of milk, another as $\frac{3}{4}$ full of grape juice, and the third as $\frac{7}{8}$ full of orange juice.





5 EIGHTHS $\frac{5}{8}$
2 EIGHTHS $\frac{2}{8}$
7 EIGHTHS $\frac{7}{8}$

Adding Like Fractions 2 sixths + 3 sixths = 5 sixths

$\frac{2}{6} + \frac{3}{6} = \frac{5}{6}$

2 sixths → $\frac{2}{6}$

3 sixths → $\frac{3}{6}$

5 sixths → $\frac{5}{6}$

Fractions having the same denominator are **like** fractions.

1. The strip of paper has been divided into sixths. How many sixths are red? How many are pink? How many are red and pink together? Use your measuring outfit to add $\frac{2}{6}$ and $\frac{3}{6}$. Is their sum $\frac{5}{6}$?

2. The circle has been divided into eighths. How many eighths are red? How many are pink? How many are red and pink together?

Put $\frac{5}{8}$ and $\frac{2}{8}$ together with your measuring outfit. Are they together equal to $\frac{7}{8}$?

3. In **1** above you added sixths. What figures or term of the fractions did you add to get the answer? What did you do to the denominator?

4. In **2** above you added eighths. What figures or term of the fractions did you add to get the answer? What did you do to the denominator?

To add like fractions, add the numerators because each numerator tells the number of parts. The denominator does not change because the denominator is the name of the parts and the name does not change.

Why the Denominator Does Not Change

Study these additions. What numbers do you add to find the sum? What tells you how to name the sum?

1 apple	1 fifth	$\frac{1}{5}$
2 apples	2 fifths	$\frac{2}{5}$
3 apples	3 fifths	$\frac{3}{5}$

Say these sums, each with its right name:

1.	4 oranges	4 sevenths	$\frac{4}{9}$
	2 oranges	2 sevenths	$\frac{2}{9}$
2.	3 cookies	3 eighths	$\frac{3}{10}$
	2 cookies	2 eighths	$\frac{2}{10}$

Study these additions. Prove each answer with your measuring outfit.

	a	b	c	d	e	f	g	h
3.	$\frac{3}{8}$	$\frac{1}{6}$	$\frac{2}{9}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{2}{5}$	$\frac{1}{3}$	$\frac{3}{6}$
	$\frac{2}{8}$	$\frac{3}{6}$	$\frac{5}{9}$	$\frac{5}{8}$	$\frac{2}{4}$	$\frac{1}{5}$	$\frac{1}{3}$	$\frac{2}{6}$
	$\frac{5}{8}$	$\frac{4}{6}$	$\frac{7}{9}$	$\frac{6}{8}$	$\frac{3}{4}$	$\frac{3}{5}$	$\frac{2}{3}$	$\frac{5}{6}$

Write the sums on folded paper:

4.	$\frac{2}{4}$	$\frac{3}{6}$	$\frac{1}{9}$	$\frac{1}{5}$	$\frac{3}{8}$	$\frac{5}{12}$	$\frac{1}{6}$	$\frac{1}{5}$
	$\frac{1}{4}$	$\frac{1}{6}$	$\frac{2}{9}$	$\frac{2}{5}$	$\frac{1}{8}$	$\frac{1}{12}$	$\frac{2}{6}$	$\frac{1}{5}$

Fractions in Problems

1. Brenda said she read half of her library book last week and half of it this week. Does she mean that she has read the whole book? How do you know?

2. The teacher tested the class on $\frac{1}{5}$ of our spelling list yesterday and on $\frac{3}{5}$ of the list today. On what part of the list has the class been tested?

3. Mother mixed $\frac{1}{3}$ cup of vinegar with $\frac{1}{3}$ cup of water. How much liquid is in the cup?

4. Judith had a candy bar which was marked off in 12 equal squares. She gave John $\frac{1}{12}$, Helen $\frac{3}{12}$, and Marie $\frac{3}{12}$. How many twelfths did Judith give away?

5. I worked $\frac{5}{6}$ of my examples last evening and $\frac{1}{6}$ this morning. What part of my examples have I worked? Am I finished?

6. I bought $\frac{1}{4}$ pound of bacon, $\frac{1}{4}$ pound of butter, and $\frac{1}{4}$ pound of tea. The grocer tied them together in one large package. What did the package weigh?

7. A man divided his money equally among his five sons. What part of the money did each son receive?

8. There were six books on the library shelf. I read five of these books. What part of the books did I read?

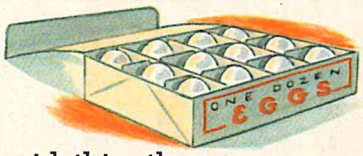
9. If meat costs $.30 a pound, what must I pay for $\frac{1}{2}$ pound?

Fractions in Their Lowest Terms

The grocer has butter in 1-pound boxes. A pound is cut into 4 sticks, each stick weighing $\frac{1}{4}$ pound.

If you went to the grocery to buy 2 sticks of butter, would you say, "Give me two-fourths pound of butter, please"? If you said it this way, the grocer would smile. It is better to say, "Give me one-half pound of butter, please."

$\frac{2}{4}$ pound $= \frac{1}{2}$ pound, and it is better to say $\frac{1}{2}$ pound when asking for something.



If you wished to buy 6 eggs, would you say, "Give me $\frac{6}{12}$ of a dozen eggs, please"? If you said this, the grocer would be puzzled. You should say, "Give me $\frac{1}{2}$ dozen eggs, please."

$\frac{6}{12}$ dozen $= \frac{1}{2}$ dozen, and we say $\frac{1}{2}$, not $\frac{6}{12}$.

In changing $\frac{2}{4}$ to $\frac{1}{2}$, and in changing $\frac{6}{12}$ to $\frac{1}{2}$, you reduced the size of the numerator and the denominator of each fraction. The numerator and the denominator are the terms of a fraction. When you change $\frac{2}{4}$ to $\frac{1}{2}$, you have reduced the fraction to lowest terms. When you change $\frac{6}{12}$ to $\frac{1}{2}$, you reduce the fraction to lowest terms.

Use your measuring outfit to show that $\frac{3}{6} = \frac{1}{2}$, $\frac{4}{8} = \frac{1}{2}$, $\frac{2}{6} = \frac{1}{3}$, $\frac{2}{8} = \frac{1}{4}$.

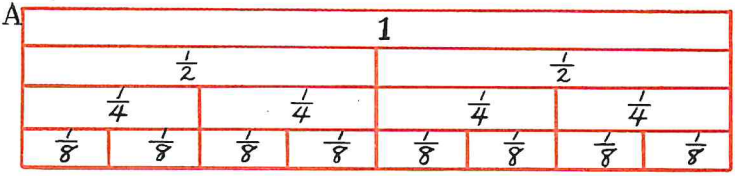
Using Diagrams to Reduce Fractions

When your mother cuts a pie that you like and will give one piece to you, do you wish her to cut it into many pieces or a few pieces? Draw a picture to explain your answer.

1. Say the number that belongs in place of each ?. Use the diagram to prove that your answer is right.

$\frac{2}{4} = \frac{?}{2}$ $\frac{2}{8} = \frac{?}{4}$ $\frac{4}{8} = \frac{?}{2}$ $\frac{6}{8} = \frac{?}{4}$

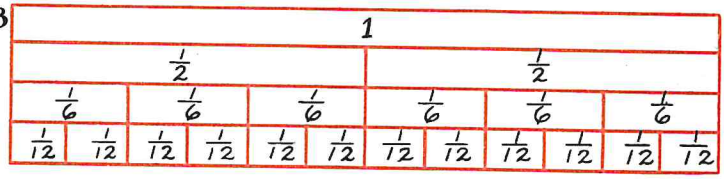
A



2. Say the number that belongs in place of each ? . Use the diagram to prove.

$\frac{3}{6} = \frac{?}{2}$ $\frac{6}{12} = \frac{?}{2}$ $\frac{2}{12} = \frac{?}{6}$ $\frac{10}{12} = \frac{?}{6}$

B



3. Draw a diagram showing thirds and ninths. Use your diagram to help you say the number that belongs in place of each ? : $\frac{3}{9} = \frac{?}{3}$; $\frac{6}{9} = \frac{?}{3}$.

4. Draw a diagram showing thirds and sixths. Use your diagram to help you say the number that belongs in place of each ? : $\frac{2}{6} = \frac{?}{3}$; $\frac{4}{6} = \frac{?}{3}$.

An Easy Way to Reduce Fractions

To reduce a fraction to lowest terms, divide both numerator and denominator by the largest number that is contained evenly in both of them. You must divide both numerator and denominator by the same number.

1. Reduce $\frac{3}{6}$ to lowest terms.

Since 3 is the largest number that is contained evenly in both numerator and denominator, you divide both numerator and denominator by 3. The answer is $\frac{1}{2}$. Look at the second diagram on page 208. Does it show that $\frac{3}{6}$ is equal to $\frac{1}{2}$?

$$\frac{3\div 3}{6\div 3} = \frac{1}{2}$$

2. Reduce $\frac{6}{8}$ to lowest terms.

Since 2 is the largest number that is contained evenly in both 6 and 8, you divide both 6 and 8 by 2. This tells us that the fraction $\frac{6}{8}$ is equal to the fraction $\frac{3}{4}$. Look at the first diagram on page 208. Can you read from the diagram that $\frac{6}{8} = \frac{3}{4}$?

$$\frac{6\div 2}{8\div 2} = \frac{3}{4}$$

Reduce each to lowest terms:

3. $\frac{4}{8}$ $\frac{2}{4}$ $\frac{4}{6}$ $\frac{6}{12}$ $\frac{2}{12}$ $\frac{3}{6}$ $\frac{2}{6}$ $\frac{3}{9}$

4. $\frac{10}{12}$ $\frac{8}{12}$ $\frac{6}{10}$ $\frac{5}{10}$ $\frac{9}{12}$ $\frac{8}{10}$ $\frac{4}{12}$ $\frac{3}{12}$

A fraction is in lowest terms when **1** *is the largest number that is contained evenly in both numerator and denominator.*

Tell which of these fractions are in lowest terms:

5. $\frac{1}{2}$ $\frac{3}{4}$ $\frac{4}{6}$ $\frac{5}{8}$ $\frac{4}{8}$ $\frac{3}{6}$ $\frac{3}{8}$ $\frac{4}{12}$

6. $\frac{7}{8}$ $\frac{4}{5}$ $\frac{2}{3}$ $\frac{6}{8}$ $\frac{2}{4}$ $\frac{8}{10}$ $\frac{5}{10}$ $\frac{5}{12}$

Reducing Answers to Lowest Terms

1. Add $\frac{1}{8}$ and $\frac{3}{8}$.

The first answer you found was $\frac{4}{8}$. By dividing both numerator and denominator by the same number 4, you find the simpler answer, $\frac{1}{2}$.

Copy and add. Reduce to lowest terms.

2.	$\frac{1}{6}$	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{2}{8}$	$\frac{1}{5}$	$\frac{3}{10}$	$\frac{5}{8}$	$\frac{1}{12}$
	$\frac{2}{6}$	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{4}{8}$	$\frac{1}{5}$	$\frac{2}{10}$	$\frac{2}{8}$	$\frac{5}{12}$
3.	$\frac{3}{6}$	$\frac{5}{8}$	$\frac{2}{9}$	$\frac{3}{8}$	$\frac{3}{10}$	$\frac{5}{12}$	$\frac{3}{7}$	$\frac{2}{9}$
	$\frac{1}{6}$	$\frac{1}{8}$	$\frac{3}{9}$	$\frac{4}{8}$	$\frac{2}{10}$	$\frac{1}{12}$	$\frac{2}{7}$	$\frac{6}{9}$
4.	$\frac{2}{4}$	$\frac{1}{10}$	$\frac{1}{9}$	$\frac{1}{6}$	$\frac{5}{10}$	$\frac{4}{12}$	$\frac{5}{12}$	$\frac{1}{10}$
	$\frac{1}{4}$	$\frac{3}{10}$	$\frac{2}{9}$	$\frac{1}{6}$	$\frac{3}{10}$	$\frac{2}{12}$	$\frac{3}{12}$	$\frac{3}{10}$
5.	$\frac{1}{4}$	$\frac{2}{6}$	$\frac{2}{5}$	$\frac{3}{7}$	$\frac{5}{12}$	$\frac{3}{10}$	$\frac{2}{9}$	$\frac{1}{8}$
	$\frac{1}{4}$	$\frac{1}{6}$	$\frac{1}{5}$	$\frac{2}{7}$	$\frac{2}{12}$	$\frac{2}{10}$	$\frac{4}{9}$	$\frac{2}{8}$
	$\frac{1}{4}$	$\frac{2}{6}$	$\frac{1}{5}$	$\frac{1}{7}$	$\frac{2}{12}$	$\frac{3}{10}$	$\frac{1}{9}$	$\frac{3}{8}$

The fractions we have been studying are called **common fractions.** If the numerator is smaller than the denominator, the fraction is a **proper** fraction. If the numerator is equal to or greater than the denominator, the fraction is an **improper** fraction. $\frac{4}{4}$ and $\frac{9}{8}$ are improper fractions.

Tell which of these are improper fractions:

6.	$\frac{3}{4}$	$\frac{4}{5}$	$\frac{4}{4}$	$\frac{7}{6}$	$\frac{2}{3}$	$\frac{6}{5}$	$\frac{8}{3}$	$\frac{2}{5}$
7.	$\frac{6}{7}$	$\frac{8}{5}$	$\frac{1}{2}$	$\frac{8}{9}$	$\frac{5}{4}$	$\frac{3}{4}$	$\frac{6}{6}$	$\frac{3}{2}$

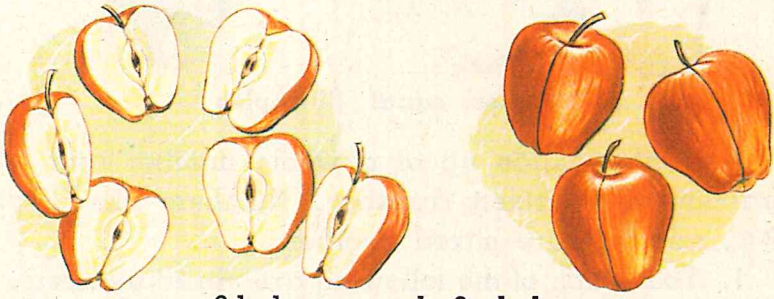
Changing Improper Fractions to Wholes

Suppose you went to a store and asked the clerk for a piece of ribbon $\frac{12}{4}$ of a yard long. He would give you 3 yards of ribbon. Explain.

$\frac{12}{4} = 4\overline{)12} = 3$

The name improper fraction hints that it is not proper to leave a fraction in that form.

1. Bring 3 apples to school, and cut each into halves. How many halves are there? If someone asked you how many apples you had, would you say, "3 apples," or "$\frac{6}{2}$ apples"?



6 halves equal 3 wholes

2. One apple has 2 halves. How many apples does it take to make 4 halves? 6 halves? 8 halves?

3. One apple has 4 fourths. How many apples does it take to make 8 fourths? 12 fourths?

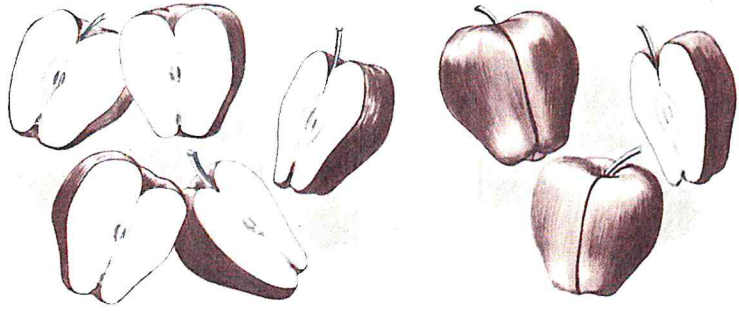
To change an improper fraction to wholes, divide the numerator by the denominator. Change these improper fractions to wholes:

4. $\frac{4}{2}$ $\frac{9}{3}$ $\frac{6}{2}$ $\frac{8}{4}$ $\frac{12}{3}$ $\frac{6}{3}$ $\frac{15}{5}$ $\frac{12}{4}$

5. $\frac{8}{2}$ $\frac{6}{6}$ $\frac{12}{6}$ $\frac{10}{2}$ $\frac{3}{3}$ $\frac{10}{5}$ $\frac{12}{12}$ $\frac{15}{3}$

Changing Improper Fractions to Mixed Numbers

John brought 3 apples to school and cut each into halves. The six half apples were equal to 3 whole apples. After a while, John ate one of the halves. He had left $\frac{5}{2}$ apples or $2\frac{1}{2}$ apples.



$\frac{5}{2}$ apples equal $2\frac{1}{2}$ apples

A number made up of a whole number and a fraction is a **mixed number.** Numbers like $2\frac{1}{2}$, $3\frac{3}{4}$, and $7\frac{1}{8}$ are mixed numbers.

1. Tell which of the following are mixed numbers.

$4\frac{1}{2}$ 5 $3\frac{1}{3}$ $\frac{4}{5}$ $6\frac{3}{4}$ 7 $8\frac{2}{3}$ $9\frac{7}{8}$

To change an improper fraction to a mixed number, divide the numerator by the denominator and write the remainder as a fraction. Study the examples below.

2. $\frac{7}{2} = 2\overline{)7}\ \begin{matrix}3\ \text{r}-1\end{matrix} = 3\frac{1}{2}$ **3.** $\frac{20}{3} = 3\overline{)20}\ \begin{matrix}6\ \text{r}-2\end{matrix} = 6\frac{2}{3}$

Change these to whole or mixed numbers.

4. $\frac{10}{5}$ $\frac{5}{4}$ $\frac{8}{4}$ $\frac{3}{2}$ $\frac{3}{3}$ $\frac{7}{4}$ $\frac{6}{5}$ $\frac{4}{3}$

5. $\frac{4}{2}$ $\frac{11}{5}$ $\frac{12}{5}$ $\frac{7}{3}$ $\frac{5}{2}$ $\frac{5}{3}$ $\frac{7}{2}$ $\frac{10}{9}$

Practice with Fractions

Add. Change any sum that is an improper fraction to a whole number or a mixed number.

1.	$\frac{7}{8}$	$\frac{5}{6}$	$\frac{8}{9}$	$\frac{3}{4}$	$\frac{4}{5}$	$\frac{2}{3}$	$\frac{4}{7}$	$\frac{11}{12}$
	$\frac{4}{8}$	$\frac{2}{6}$	$\frac{5}{9}$	$\frac{2}{4}$	$\frac{4}{5}$	$\frac{1}{3}$	$\frac{6}{7}$	$\frac{8}{12}$
2.	$\frac{7}{9}$	$\frac{3}{8}$	$\frac{5}{7}$	$\frac{1}{4}$	$\frac{4}{5}$	$\frac{2}{3}$	$\frac{7}{12}$	$\frac{4}{8}$
	$\frac{7}{9}$	$\frac{5}{8}$	$\frac{4}{7}$	$\frac{3}{4}$	$\frac{3}{5}$	$\frac{2}{3}$	$\frac{5}{12}$	$\frac{4}{8}$
3.	$\frac{1}{8}$	$\frac{5}{6}$	$\frac{4}{5}$	$\frac{2}{9}$	$\frac{2}{3}$	$\frac{3}{12}$	$\frac{7}{8}$	$\frac{1}{2}$
	$\frac{5}{8}$	$\frac{2}{6}$	$\frac{3}{5}$	$\frac{8}{9}$	$\frac{1}{3}$	$\frac{7}{12}$	$\frac{3}{8}$	$\frac{1}{2}$
	$\frac{3}{8}$	$\frac{5}{6}$	$\frac{1}{5}$	$\frac{1}{9}$	$\frac{1}{3}$	$\frac{7}{12}$	$\frac{1}{8}$	$\frac{1}{2}$
4.	$\frac{3}{8}$	$\frac{4}{10}$	$\frac{11}{12}$	$\frac{1}{10}$	$\frac{5}{12}$	$\frac{5}{8}$	$\frac{1}{8}$	$\frac{7}{8}$
	$\frac{2}{8}$	$\frac{3}{10}$	$\frac{11}{12}$	$\frac{2}{10}$	$\frac{5}{12}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{5}{8}$
	$\frac{2}{8}$	$\frac{3}{10}$	$\frac{3}{12}$	$\frac{3}{10}$	$\frac{4}{12}$	$\frac{1}{8}$	$\frac{7}{8}$	$\frac{3}{8}$
5.	$\frac{4}{6}$	$\frac{4}{15}$	$\frac{7}{12}$	$\frac{1}{6}$	$\frac{1}{8}$	$\frac{5}{10}$	$\frac{5}{9}$	$\frac{3}{5}$
	$\frac{5}{6}$	$\frac{1}{15}$	$\frac{5}{12}$	$\frac{5}{6}$	$\frac{7}{8}$	$\frac{7}{10}$	$\frac{4}{9}$	$\frac{1}{5}$
	$\frac{1}{6}$	$\frac{7}{15}$	$\frac{1}{12}$	$\frac{1}{6}$	$\frac{5}{8}$	$\frac{3}{10}$	$\frac{8}{9}$	$\frac{4}{5}$
	$\frac{5}{6}$	$\frac{2}{15}$	$\frac{4}{12}$	$\frac{2}{6}$	$\frac{1}{8}$	$\frac{9}{10}$	$\frac{5}{9}$	$\frac{1}{5}$
	$\frac{1}{6}$	$\frac{1}{15}$	$\frac{7}{12}$	$\frac{3}{6}$	$\frac{2}{8}$	$\frac{6}{10}$	$\frac{5}{9}$	$\frac{1}{5}$

For Your Notebook

Be able to spell and to use each word.

common fraction	terms of a fraction	thirds
proper fraction	denominator	fourths
improper fraction	numerator	eighths
reduce	halves	ninths

More About Fractions and Mixed Numbers

The fraction that is part of a mixed number must be in lowest terms.

1. Change the improper fraction $\frac{8}{6}$ to a mixed number.

$\frac{8}{6} = 6\overline{)8}^{1} = 1\frac{2}{6} = 1\frac{1}{3}$

$\frac{6}{2}$

The first mixed number you find is $1\frac{2}{6}$. The fraction $\frac{2}{6}$ may be reduced to $\frac{1}{3}$. The answer, then, is $1\frac{1}{3}$.

2. Change each of these improper fractions to a mixed number. Reduce the fraction of each mixed number to lowest terms.

$\frac{6}{4}$ $\frac{15}{10}$ $\frac{10}{4}$ $\frac{5}{4}$ $\frac{9}{6}$ $\frac{12}{9}$ $\frac{10}{6}$ $\frac{16}{12}$

Add. Change all sums to mixed numbers. Leave the fraction of each mixed number in lowest terms.

3.

$\frac{4}{6}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{4}{5}$	$\frac{3}{8}$	$\frac{2}{4}$	$\frac{2}{3}$	$\frac{3}{5}$
$\frac{5}{6}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{3}{5}$	$\frac{7}{8}$	$\frac{3}{4}$	$\frac{2}{3}$	$\frac{4}{5}$

4.

$\frac{7}{8}$	$\frac{9}{10}$	$\frac{3}{8}$	$\frac{10}{12}$	$\frac{4}{8}$	$\frac{4}{5}$	$\frac{5}{6}$	$\frac{2}{5}$
$\frac{5}{8}$	$\frac{6}{10}$	$\frac{9}{8}$	$\frac{5}{12}$	$\frac{7}{8}$	$\frac{3}{5}$	$\frac{3}{6}$	$\frac{4}{5}$

5.

$\frac{4}{7}$	$\frac{5}{9}$	$\frac{7}{12}$	$\frac{4}{5}$	$\frac{5}{6}$	$\frac{5}{8}$	$\frac{7}{9}$	$\frac{1}{2}$
$\frac{6}{7}$	$\frac{8}{9}$	$\frac{7}{12}$	$\frac{4}{5}$	$\frac{3}{6}$	$\frac{7}{8}$	$\frac{4}{9}$	$\frac{1}{2}$
$\frac{4}{7}$	$\frac{2}{9}$	$\frac{1}{12}$	$\frac{2}{5}$	$\frac{2}{6}$	$\frac{6}{8}$	$\frac{4}{9}$	$\frac{1}{2}$

6. Jack is collecting copper to sell. He has one piece that weighs $\frac{7}{8}$ lb., another that weighs $\frac{5}{8}$ lb., another that weighs $\frac{3}{8}$ lb., and a fourth that weighs $\frac{1}{8}$ lb. How much do they all weigh?

First Call to the Rifle Range

Mark papers after each section.

Section 1. Write answers only. Which fraction in each pair of fractions is the greater?

1. $\frac{1}{8}$ or $\frac{1}{4}$ $\quad$ $\frac{1}{6}$ or $\frac{1}{8}$ $\quad$ $\frac{1}{4}$ or $\frac{1}{2}$ $\quad$ $\frac{1}{4}$ or $\frac{1}{6}$
2. $\frac{3}{8}$ or $\frac{1}{2}$ $\quad$ $\frac{3}{8}$ or $\frac{1}{4}$ $\quad$ $\frac{5}{6}$ or $\frac{2}{3}$ $\quad$ $\frac{7}{8}$ or $\frac{3}{8}$

Section 2. Copy with each blank filled in:

3. $\frac{1}{2}=\frac{?}{4}$ $\quad$ $\frac{1}{3}=\frac{?}{12}$ $\quad$ $\frac{1}{3}=\frac{?}{6}$ $\quad$ $\frac{1}{2}=\frac{?}{6}$
4. $\frac{2}{3}=\frac{?}{6}$ $\quad$ $\frac{1}{2}=\frac{?}{10}$ $\quad$ $\frac{2}{3}=\frac{?}{9}$ $\quad$ $\frac{3}{4}=\frac{?}{8}$

Section 3. Reduce to lowest terms:

5. $\frac{2}{4}$ $\quad$ $\frac{4}{6}$ $\quad$ $\frac{4}{8}$ $\quad$ $\frac{3}{9}$ $\quad$ $\frac{4}{10}$ $\quad$ $\frac{6}{12}$ $\quad$ $\frac{3}{6}$ $\quad$ $\frac{4}{12}$
6. $\frac{3}{6}$ $\quad$ $\frac{5}{10}$ $\quad$ $\frac{8}{12}$ $\quad$ $\frac{6}{9}$ $\quad$ $\frac{6}{10}$ $\quad$ $\frac{9}{12}$ $\quad$ $\frac{8}{10}$ $\quad$ $\frac{3}{12}$

Section 4. Change to whole or mixed numbers.

7. $\frac{8}{4}$ $\quad$ $\frac{11}{4}$ $\quad$ $\frac{14}{4}$ $\quad$ $\frac{12}{3}$ $\quad$ $\frac{8}{3}$ $\quad$ $\frac{18}{6}$ $\quad$ $\frac{15}{6}$ $\quad$ $\frac{8}{6}$
8. $\frac{12}{9}$ $\quad$ $\frac{9}{2}$ $\quad$ $\frac{6}{4}$ $\quad$ $\frac{12}{8}$ $\quad$ $\frac{16}{5}$ $\quad$ $\frac{10}{5}$ $\quad$ $\frac{10}{3}$ $\quad$ $\frac{15}{3}$

Section 5. Add. Write answers in best form.

9. $\frac{7}{9}$ $\quad$ $\frac{7}{8}$ $\quad$ $\frac{3}{6}$ $\quad$ $\frac{7}{10}$ $\quad$ $\frac{6}{7}$ $\quad$ $\frac{1}{8}$ $\quad$ $\frac{1}{4}$ $\quad$ $\frac{3}{8}$

$\frac{5}{9}$ $\quad$ $\frac{5}{8}$ $\quad$ $\frac{1}{6}$ $\quad$ $\frac{2}{10}$ $\quad$ $\frac{1}{7}$ $\quad$ $\frac{5}{8}$ $\quad$ $\frac{3}{4}$ $\quad$ $\frac{7}{8}$

$\underline{\frac{3}{9}}$ $\quad$ $\underline{\frac{2}{8}}$ $\quad$ $\underline{\frac{4}{6}}$ $\quad$ $\underline{\frac{4}{10}}$ $\quad$ $\underline{\frac{5}{7}}$ $\quad$ $\underline{\frac{6}{8}}$ $\quad$ $\underline{\frac{2}{4}}$ $\quad$ $\underline{\frac{6}{8}}$

You had 56 shots on this page. If you made at least 52 hits, you may work on page 217.

The rest of you will work on page 216.

Second Call to the Rifle Range

Write the answers. Check. Study the pages given in parentheses if you make mistakes.

1. Write the largest of these fractions: $\frac{1}{3}$, $\frac{1}{2}$, $\frac{1}{4}$. (198)

2. One of these fractions is a proper fraction: $\frac{1}{2}$, $\frac{8}{5}$, $\frac{4}{4}$. Write it. (210)

3. One of these fractions is an improper fraction: $\frac{3}{4}$, $\frac{8}{5}$, $\frac{2}{3}$. Write it. (210)

4. One of these fractions is not reduced to lowest terms: $\frac{2}{3}$, $\frac{6}{8}$, $\frac{5}{9}$. Write it; reduce it. (209)

5. Taken together, the numerator and the denominator are called the ? of a fraction. (196)

6. The ? of a fraction tells into how many parts the whole is divided. (196)

7. The ? of a fraction tells how many parts are being used now. (196)

8. One of these is a mixed number: $\frac{2}{3}$, 5, $3\frac{1}{2}$. Write it. (212)

9. The fraction of one of these mixed numbers is not reduced to lowest terms: $2\frac{1}{3}$, $4\frac{3}{6}$, $6\frac{3}{4}$. Write it and reduce it to lowest terms. (214)

10. The sum of $\frac{2}{9}$ and $\frac{5}{9}$ is ?. (204)

11. Which are proper fractions? $\frac{1}{4}$, $\frac{5}{2}$, $\frac{7}{3}$, $\frac{2}{5}$? (210)

Special Duties for Sharpshooters

1. What is the cost of the morning newspaper in your community? The afternoon newspaper? The Sunday paper? If your family buys a morning newspaper, an afternoon newspaper, and a Sunday paper regularly, about what is the cost for one year?

2. Make a list of ten ways a boy or girl can earn money. Discuss in your language period: What I would do if I wanted to earn a dollar.

3. Think of a job you would like to have when you grow up. How much could you make at this job in a year?

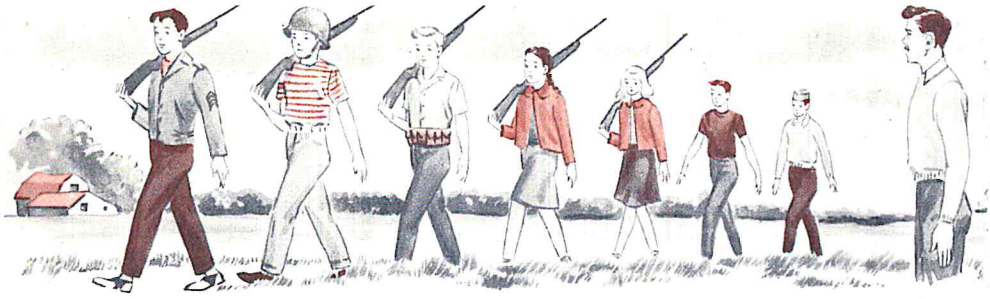
4. About how much does it cost to build a 6-room frame house?

5. About how much does the doctor charge when he makes a call at your home?

6. A line was $2\frac{1}{4}$ inches long. Robert made it $\frac{1}{4}$ inch longer on one end and $\frac{3}{4}$ inch longer on the other end. How long was it then?

7. Tom said he ate $\frac{1}{2}$ of a pie, Jane ate $\frac{3}{6}$ of a pie, and Harry ate $\frac{4}{8}$ of a pie. Which of the three ate the most pie?

8. To bake a cake, Mother mixed $\frac{1}{8}$ lb. of raisins, $\frac{1}{8}$ lb. of dates, $\frac{1}{8}$ lb. of pineapple, and $\frac{5}{8}$ lb. of sugar. How much did the mixture weigh?



Dress Parade—Review of Unit 8

1. Reduce these fractions to lowest terms:

$\frac{2}{8}$ $\frac{4}{12}$ $\frac{8}{10}$ $\frac{4}{6}$ $\frac{4}{8}$ $\frac{9}{12}$ $\frac{5}{10}$ $\frac{6}{9}$

2. Change these fractions to mixed numbers:

$\frac{5}{4}$ $\frac{8}{7}$ $\frac{9}{4}$ $\frac{12}{10}$ $\frac{6}{4}$ $\frac{5}{3}$ $\frac{8}{6}$ $\frac{9}{6}$

3. Copy and add. Change all improper fractions to whole numbers or mixed numbers.

				$\frac{8}{9}$	$\frac{1}{8}$	$\frac{3}{7}$	$\frac{3}{12}$
$\frac{1}{3}$	$\frac{3}{4}$	$\frac{7}{8}$	$\frac{3}{8}$	$\frac{4}{9}$	$\frac{3}{8}$	$\frac{5}{7}$	$\frac{5}{12}$
$\frac{2}{3}$	$\frac{5}{4}$	$\frac{6}{8}$	$\frac{1}{8}$	$\frac{3}{9}$	$\frac{2}{8}$	$\frac{6}{7}$	$\frac{7}{12}$

4. The butcher sold Mrs. White $\frac{3}{4}$ lb. of bacon and $\frac{3}{4}$ lb. of liver. How many pounds of meat did Mrs. White buy?

5. John walked $\frac{1}{8}$ mile to meet Joe, then $\frac{3}{8}$ mile to get bait, and then $\frac{7}{8}$ mile to a good fishing pond. How far did John walk in all?

6. Joan practiced $\frac{3}{4}$ hour Monday, $\frac{3}{4}$ hour Tuesday, and $\frac{3}{4}$ hour Wednesday. How much did she practice in the three days?

7. Jerry gained $\frac{5}{8}$ pound this week, $\frac{3}{8}$ pound last week, and $\frac{7}{8}$ pound the week before. How much did he gain in the three weeks?

Fractional Parts of Numbers

When Tom sells papers he does arithmetic at the same time. He has to do arithmetic to keep his paper accounts straight.

1. The boss left a roll of 120 papers. The boss said $\frac{1}{3}$ of them were *Stars* and the rest *Posts.* How many *Stars* were there?

To find $\frac{1}{3}$ of a number, divide it by 3.

2. What would Tom have done to find the answer if the boss had told him that $\frac{1}{2}$ the papers were *Stars*? If $\frac{1}{4}$ were *Stars*? If $\frac{1}{5}$ were *Stars*? If $\frac{1}{6}$ were *Stars*? If $\frac{1}{8}$ were *Stars*?

3. Tom sold $\frac{1}{6}$ of his papers within 10 minutes. How many papers did he sell in these 10 minutes?

4. He had $\frac{1}{8}$ of his 120 papers left when the boss came to his corner to collect. How many papers did he have left?

5. The boss took $\frac{1}{10}$ of the 120 papers to another corner. How many papers did the boss take?

Finding More Than One Part

The geography book says a volcano in the West Indies is about $\frac{3}{4}$ mile high. How high is that?

Remember there are 5,280 feet in a mile.

First, find $\frac{1}{4}$ of 5,280 by dividing 5,280 by 4. This is 1,320.

Then, find $\frac{3}{4}$ of 5,280 by multiplying 1,320 by 3. The answer to the problem is 3,960 feet.

1. One day Tom sold $\frac{5}{6}$ of his 120 papers in 20 minutes. How many papers was this?

2. Father had $15 and spent $\frac{2}{3}$ of it. How much did he spend?

3. Billy and Joe had 450 marbles. They decided to divide them. Billy was to have $\frac{5}{9}$ of the marbles. How many did Billy get?

4. A dozen eggs cost 45 cents. How much will $\frac{2}{3}$ dozen eggs cost?

Write the answers:

5. $\frac{3}{4}$ of 12 $\frac{5}{6}$ of 18 $\frac{3}{4}$ of 20 $\frac{2}{5}$ of 25

6. $\frac{3}{8}$ of 32 $\frac{4}{5}$ of 45 $\frac{7}{8}$ of 56 $\frac{3}{5}$ of 60

7. $\frac{6}{7}$ of 63 $\frac{5}{8}$ of 64 $\frac{2}{7}$ of 140 $\frac{5}{9}$ of 108

8. *There are 36 inches in a yard.* How many inches are in $\frac{1}{2}$ yd.? $\frac{1}{3}$ yd.? $\frac{2}{3}$ yd.? $\frac{1}{4}$ yd.? $\frac{3}{4}$ yd.? $\frac{1}{6}$ yd.? $\frac{5}{6}$ yd.?

9. *There are 16 ounces in a pound.* How many ounces are in $\frac{1}{4}$ lb.? $\frac{3}{4}$ lb.? $\frac{1}{8}$ lb.? $\frac{3}{8}$ lb.?

Fun on a Hike and Some Arithmetic

One of our neighbors, Mr. West, invited 32 of us children to go on a hike to Valley Lodge. He said, "Fifth graders ought to know fractions. I will give you some fraction problems as we hike. The first one who gets the answer will get a chocolate bar. You will have to work for your candy on this hike."

These are the problems Mr. West gave. Try to get the answers quickly.

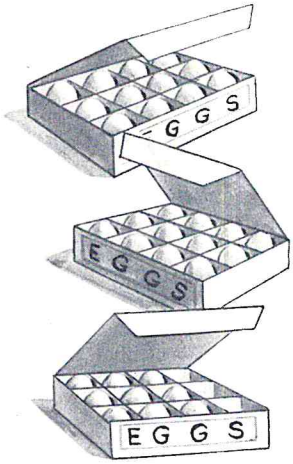
1. Thirty-two children were invited. Only $\frac{3}{4}$ of them have come. How many children came?

2. It is 8 miles in all to Valley Lodge. We have now gone one-half of the way and it is time for lunch. How far did we hike before lunch?

3. After lunch, he said, "We had 100 sandwiches. We ate $\frac{2}{5}$ of them. How many sandwiches are left?"

4. At 3 o'clock in the afternoon, $\frac{7}{8}$ of the 24 children on the hike voted to rest and get a cool drink. How many children was this?

5. Five-eighths of the children will have to sleep outdoors. How many will sleep outdoors?



Multiplying by a Mixed Number

Martha has $2\frac{3}{4}$ dozen eggs. How many eggs is that?

$\frac{3}{4}$ dozen is 9, for $\frac{3}{4} \times 12 = 9$.

2 dozen is 24, for $2 \times 12 = 24$.

Then, $2\frac{3}{4}$ dozen is 33.

Martha has 33 eggs.

One way to find $\frac{3}{4}$ of 12 is to find $\frac{1}{4}$ of 12 and multiply that answer by 3. We divide first and then multiply.

Another way to find $\frac{3}{4}$ of 12 is to multiply 12 by 3 and take $\frac{1}{4}$ of the product. We multiply first and then divide.

Whether we divide first and then multiply, or multiply first and then divide, the answer is the same. In multiplying by a mixed number, the second way is usually better.

$$\begin{array}{r} 12 \\ \times\ 2\frac{3}{4} \\ \hline 4\overline{)36} \\ 9 \\ 24 \\ \hline 33 \end{array}$$

Copy the numbers below, and multiply without looking at the book.

$$\begin{array}{r} 12 \\ \times\ 4\frac{2}{3} \\ \hline 3\overline{)24} \\ 8 \\ 48 \\ \hline 56 \end{array} \qquad \begin{array}{r} 16 \\ \times\ 3\frac{5}{8} \\ \hline 8\overline{)80} \\ 10 \\ 48 \\ \hline 58 \end{array} \qquad \begin{array}{r} 36 \\ \times\ 5\frac{3}{4} \\ \hline 4\overline{)108} \\ 27 \\ 180 \\ \hline 207 \end{array} \qquad \begin{array}{r} 72 \\ \times\ 6\frac{2}{3} \\ \hline 3\overline{)144} \\ 48 \\ 432 \\ \hline 480 \end{array}$$

Practice in Multiplying by Mixed Numbers

Find the products:

1.	$6\frac{2}{3} \times 18$	$3\frac{5}{6} \times 36$	$3\frac{7}{12} \times 24$
2.	$7\frac{5}{12} \times 36$	$5\frac{3}{8} \times 96$	$4\frac{3}{4} \times 28$
3.	$3\frac{7}{8} \times 56$	$5\frac{5}{6} \times 48$	$7\frac{5}{8} \times 40$
4.	$6\frac{4}{5} \times 45$	$7\frac{3}{5} \times 35$	$8\frac{2}{5} \times 75$
5.	$7\frac{3}{8} \times 64$	$1\frac{7}{8} \times 56$	$7\frac{3}{4} \times 12$

6. Mary is $4\frac{2}{3}$ feet tall. How many inches is this? (Think: How many inches in one foot?)

7. Mother bought $3\frac{3}{4}$ pounds of butter. How many ounces was this? (Think: How many ounces of butter make one pound?)

8. Jack fell and broke $3\frac{1}{3}$ dozen eggs. How many eggs did he break?

9. Find the cost of $2\frac{3}{4}$ pounds of cheese at \$.64 a pound.

10. How much will $4\frac{3}{4}$ pounds of butter cost at \$.48 a pound?

11. How much must I pay for $4\frac{1}{2}$ pounds of tomatoes at \$.12 a pound?

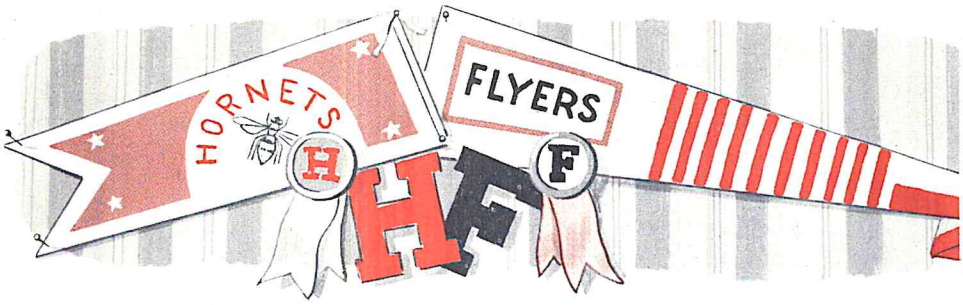
12. If bananas are priced at \$.08 a pound, what must I pay for $6\frac{3}{4}$ pounds?

\$.64
$2\frac{3}{4}$
4)192
48
128
176
\$1.76

13. What is the cost of $6\frac{1}{4}$ pounds of ripe peaches at 8 cents a pound?

14. What is the cost of $6\frac{2}{3}$ dozen plums at 12 cents a dozen?

15.	$6\frac{7}{8} \times \$.40$	$6\frac{7}{8} \times \$.32$	$4\frac{3}{8} \times \$.48$
16.	$3\frac{3}{4} \times \$.36$	$4\frac{5}{6} \times \$.18$	$5\frac{2}{5} \times \$.35$
17.	$9\frac{2}{3} \times \$.24$	$6\frac{2}{3} \times \$.54$	$8\frac{3}{5} \times \$.45$



Pennant Races

Choose two teams. After each race check papers. Help your team win.

Race I. Add:

5	3	26	35	315	784	291	948
0	1	45	9	465	210	57	8
6	4	30	7	231	57	328	300
7	0	18	29	713	629	46	39
2	5	24	52	902	42	186	77

Race II. Divide:

A. $3\overline{)1{,}911}$ $6\overline{)4{,}986}$ $20\overline{)9{,}040}$ $70\overline{)5{,}040}$

B. $28\overline{)5{,}880}$ $17\overline{)3{,}502}$ $62\overline{)3{,}906}$ $87\overline{)2{,}784}$

C. $50\overline{)1{,}500}$ $350\overline{)1{,}050}$ $750\overline{)15{,}000}$ $720\overline{)1{,}440}$

Race III. Multiply:

45	48	64	72	56	65
$6\frac{3}{5}$	$5\frac{2}{3}$	$7\frac{5}{8}$	$3\frac{3}{4}$	$2\frac{5}{8}$	$3\frac{2}{5}$

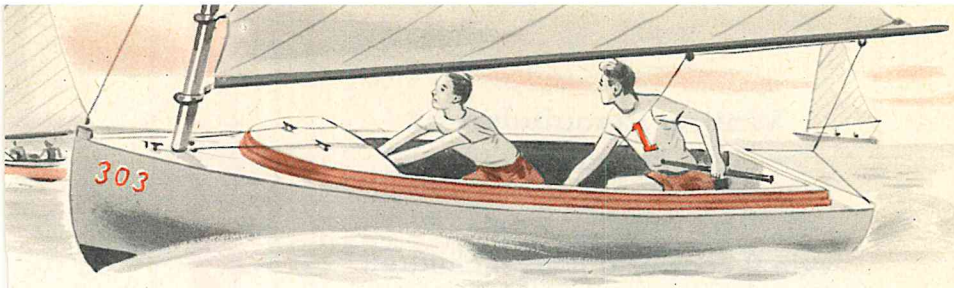
Race IV.

1. Find the cost of $6\frac{2}{3}$ yards of ribbon at \$.72 a yard.

2. There are 24 hours in a day. How many hours are in $4\frac{5}{8}$ days?

3. How many inches are there in $8\frac{5}{6}$ feet?

4. How many ounces are there in $6\frac{5}{8}$ pounds?



Contest with the Clock

Can You Beat the Clock Every Time?

First Chance. Use folded paper. Add in 4 minutes.

	a	b	c	d	e
1.	4,283	3,847	2,930	3,849	2,348
	2,090	4,955	3,209	6,392	3,002
	7,132	1,239	3,120	9,132	8,913
2.	5,293	7,938	2,039	1,399	3,948
	4,029	3,948	3,021	3,049	3,927
	4,298	8,392	7,123	3,084	3,209

Second Chance. Use folded paper. Subtract in 4 minutes.

3.	4,092	2,968	3,000	5,398	8,695
	2,385	1,390	1,999	3,984	3,598
4.	4,130	6,983	2,090	3,895	6,978
	2,099	4,298	1,904	2,354	6,973
5.	7,930	5,938	9,683	1,111	8,009
	6,594	5,138	9,302	1,000	3,999

Writing Remainders as Fractions

$4\overline{)9}\ 2\ r-1$ or $4\overline{)9}\ 2\frac{1}{4}$

1. Mrs. Smith wants to divide 9 cookies among 4 children. How many will each get?

She can give 2 cookies to each child and have 1 cookie left. This she can divide into fourths, and give each child $\frac{1}{4}$ cookie more. Each child will get $2\frac{1}{4}$ cookies.

2. Ann had 7 cookies and wished to share them equally with James. How many will each have?

We used to say	Now we say
$2\overline{)7}\ 3\ r-1$	$2\overline{)7}\ 3\frac{1}{2}$

The remainder 1 divided by the divisor 2 gives $\frac{1}{2}$. What kind of number is $3\frac{1}{2}$?

3. James had 14 cakes. He wished to divide them among 4 boys. How many will each get?

We used to say	Now we say
$4\overline{)14}\ 3\ r-2$	$4\overline{)14}\ 3\frac{2}{4}=3\frac{1}{2}$

In division, you can change the remainder to a fraction by using the remainder as numerator and the divisor as denominator of the fraction. Whenever this fraction is not in lowest terms, reduce it to lowest terms.

Practice and Problems

Divide. Write the remainders as fractions.

1.	$5\overline{)22}$	$6\overline{)13}$	$4\overline{)15}$	$3\overline{)25}$	$7\overline{)23}$	$8\overline{)15}$
2.	$2\overline{)45}$	$3\overline{)38}$	$6\overline{)47}$	$8\overline{)27}$	$4\overline{)31}$	$5\overline{)88}$
3.	$4\overline{)545}$	$5\overline{)465}$	$8\overline{)667}$	$9\overline{)596}$	$3\overline{)872}$	$7\overline{)789}$
4.	$4\overline{)18}$	$6\overline{)28}$	$6\overline{)32}$	$4\overline{)22}$	$9\overline{)30}$	$8\overline{)18}$
5.	$12\overline{)50}$	$10\overline{)25}$	$4\overline{)30}$	$6\overline{)38}$	$4\overline{)26}$	$9\overline{)39}$
6.	$12\overline{)27}$	$10\overline{)45}$	$6\overline{)74}$	$8\overline{)98}$	$4\overline{)66}$	$6\overline{)45}$
7.	$8\overline{)178}$	$6\overline{)567}$	$8\overline{)596}$	$9\overline{)849}$	$6\overline{)675}$	$8\overline{)100}$

8. A slab of bacon weighed 15 lb. The butcher cut it into 4 equal parts. What did each part weigh?

9. Mother bought 16 yards of sheeting and cut it into six equal parts. How many yards long was each part?

10. Mary bought ribbons for our girls' club. She bought a piece of ribbon measuring 39 inches and cut it into equal parts for the 12 girls in the club. How long was each piece?

11. Ruth baked 88 cookies. How many dozen did she bake? *Think: How many cookies make a dozen?*

12. John jumped over a fence that was 32 inches high. How many feet high did he jump?

13. Mary knitted a scarf that was 39 inches long. How many feet long was this scarf?

Changing Fractions to Higher Terms

What are the terms of a fraction? (Page 196)

How do you reduce a fraction to lowest terms? (Page 209) Give a rule for reducing a fraction to lowest terms.

We must also be able to change fractions to higher terms.

Study the examples below:

Reducing to Lowest Terms

$$\frac{8}{12} = \frac{8 \div 4}{12 \div 4} = \frac{2}{3}$$

Changing to Higher Terms

$$\frac{2}{3} = \frac{2 \times 4}{3 \times 4} = \frac{8}{12}$$

To reduce $\frac{8}{12}$ to lowest terms, you divide both numerator and denominator by the same number 4. Each term of the fraction is made smaller.

To change $\frac{2}{3}$ to higher terms, you multiply both numerator and denominator by the same number. Each term of the fraction is made larger.

1. Change $\frac{2}{3}$ to an equal fraction whose denominator is 12.

Think, the denominator 3 must be multiplied by 4 to make a new denominator 12. The numerator must be multiplied by the same number 4. The new numerator will be 8. The answer is $\frac{8}{12}$.

Write the number that belongs in place of each ?:

	a	b	c	d
2.	$\frac{1}{2} = \frac{?}{4}$	$\frac{1}{3} = \frac{?}{12}$	$\frac{1}{3} = \frac{?}{6}$	$\frac{1}{2} = \frac{?}{8}$
3.	$\frac{1}{4} = \frac{?}{12}$	$\frac{1}{2} = \frac{?}{6}$	$\frac{1}{2} = \frac{?}{12}$	$\frac{1}{4} = \frac{?}{8}$
4.	$\frac{1}{6} = \frac{?}{12}$	$\frac{2}{3} = \frac{?}{6}$	$\frac{2}{3} = \frac{?}{12}$	$\frac{3}{4} = \frac{?}{8}$
5.	$\frac{3}{4} = \frac{?}{12}$	$\frac{1}{3} = \frac{?}{9}$	$\frac{1}{3} = \frac{?}{12}$	$\frac{2}{3} = \frac{?}{9}$

Adding Unlike Fractions

Fractions having different denominators are **unlike** *fractions.*

BETH: Don, how can I add $\frac{1}{2}$ and $\frac{1}{8}$?

DON: You can't add $\frac{1}{2}$ and $\frac{1}{8}$. Halves and eighths are not alike, and you can't add things that are not alike.

BETH: I know they are not alike, but there must be some way to add them. I'll ask our teacher.

TEACHER: You can't add things that are not alike. You can't add 2 arithmetics and 3 geographies. You must think of some "like" or "common" name to give them before you can add. What common name do they have?

BETH AND DON: We could call them books and add them.

TEACHER: That is right. You can add 2 books and 3 books and get 5 books. It is just the same when you try to add unlike fractions. You must change them so they will have the same name (denominator) before you add. When two fractions have the same denominator, we say they have a common denominator. How would you add $\frac{1}{2}$ and $\frac{1}{8}$?

BETH: I can change $\frac{1}{2}$ to $\frac{4}{8}$.

This is the work that Beth put on the blackboard. She changed $\frac{1}{2}$ to eighths so she could add it to $\frac{1}{8}$.

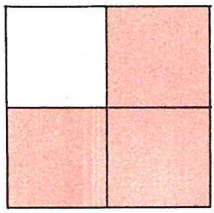
$$\frac{1}{2} = \frac{4}{8}$$
$$\frac{1}{8} = \frac{1}{8}$$
$$\frac{5}{8}$$

More About Adding Unlike Fractions

1. Jack mowed $\frac{1}{2}$ of the yard this morning and $\frac{1}{4}$ of it this afternoon. What part did he mow?

You can change $\frac{1}{2}$ to $\frac{2}{4}$. The fractions then have a common denominator. The sum is $\frac{3}{4}$.

$$\frac{1}{2} = \frac{2}{4}$$
$$\frac{1}{4} = \frac{1}{4}$$
$$\frac{3}{4}$$



Before you add unlike fractions, change them so they have a common denominator.

Study these additions. Then copy the numbers and add them without looking at the book.

2. Add $\frac{1}{4}$ and $\frac{3}{8}$; $\frac{2}{3}$ and $\frac{1}{6}$; $\frac{1}{6}$ and $\frac{1}{2}$.

$\frac{1}{4} = \frac{2}{8}$ $\quad$ $\frac{2}{3} = \frac{4}{6}$ $\quad$ $\frac{1}{6} = \frac{1}{6}$

$\frac{3}{8} = \frac{3}{8}$ $\quad$ $\frac{1}{6} = \frac{1}{6}$ $\quad$ $\frac{1}{2} = \frac{3}{6}$

$\frac{5}{8}$ $\quad$ $\frac{5}{6}$ $\quad$ $\frac{4}{6} = \frac{2}{3}$

3. Add these unlike fractions:

$\frac{3}{4}$	$\frac{1}{3}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{2}$	$\frac{3}{10}$	$\frac{1}{4}$	$\frac{3}{4}$
$\frac{1}{8}$	$\frac{1}{6}$	$\frac{3}{8}$	$\frac{1}{10}$	$\frac{2}{9}$	$\frac{3}{10}$	$\frac{1}{5}$	$\frac{5}{8}$	$\frac{5}{8}$

4. Mother made a mixture of $\frac{1}{8}$ cup syrup, $\frac{1}{2}$ cup water, and $\frac{1}{4}$ cup milk. How much mixture was there?

The common denominator must contain each of the given denominators evenly. The common denominator is 8.

$$\frac{1}{8} = \frac{1}{8}$$
$$\frac{1}{2} = \frac{4}{8}$$
$$\frac{1}{4} = \frac{2}{8}$$
$$\frac{7}{8}$$

Practice in Adding Unlike Fractions

1. Find the common denominator for each group:

$\frac{1}{2}, \frac{1}{4}, \frac{3}{4}$ $\quad$ $\frac{7}{8}, \frac{1}{2}, \frac{3}{4}$ $\quad$ $\frac{1}{2}, \frac{2}{3}, \frac{5}{6}$

Find the missing numerators:

2. $\frac{1}{4} = \frac{?}{12}$ $\quad$ $\frac{2}{3} = \frac{?}{12}$ $\quad$ $\frac{2}{3} = \frac{?}{9}$

3. $\frac{2}{5} = \frac{?}{15}$ $\quad$ $\frac{3}{8} = \frac{?}{16}$ $\quad$ $\frac{4}{5} = \frac{?}{20}$

4. $\frac{3}{4} = \frac{?}{24}$ $\quad$ $\frac{7}{8} = \frac{?}{24}$ $\quad$ $\frac{5}{6} = \frac{?}{12}$

Copy and add. Write answers in best form.

5.

$\frac{3}{8}$	$\frac{8}{9}$	$\frac{1}{2}$	$\frac{2}{3}$	$\frac{7}{12}$	$\frac{5}{6}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{4}{5}$
$\frac{1}{2}$	$\frac{2}{3}$	$\frac{7}{10}$	$\frac{1}{12}$	$\frac{2}{3}$	$\frac{2}{3}$	$\frac{3}{4}$	$\frac{5}{6}$	$\frac{3}{10}$

6.

$\frac{1}{8}$	$\frac{2}{3}$	$\frac{3}{5}$	$\frac{5}{6}$	$\frac{3}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{10}$	$\frac{1}{2}$
$\frac{1}{2}$	$\frac{1}{6}$	$\frac{1}{5}$	$\frac{1}{3}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{6}$	$\frac{1}{5}$	$\frac{1}{3}$
$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{10}$	$\frac{5}{12}$	$\frac{7}{12}$	$\frac{7}{8}$	$\frac{2}{3}$	$\frac{1}{2}$	$\frac{11}{12}$

7.

$\frac{1}{3}$	$\frac{1}{2}$	$\frac{4}{5}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{2}{9}$
$\frac{2}{3}$	$\frac{2}{3}$	$\frac{1}{2}$	$\frac{5}{6}$	$\frac{7}{8}$	$\frac{3}{4}$	$\frac{7}{10}$	$\frac{2}{3}$	$\frac{1}{3}$
$\frac{5}{6}$	$\frac{5}{6}$	$\frac{7}{10}$	$\frac{7}{12}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{20}$	$\frac{5}{12}$	$\frac{5}{9}$

8. Why do we call a 25-cent piece a quarter?

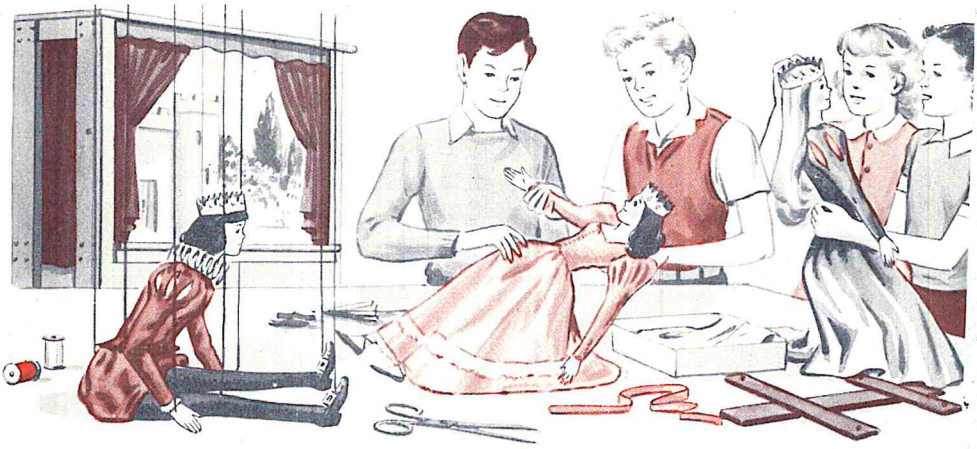
9. Why do we call a 50-cent piece a half dollar?

10. Is 12 a common denominator for halves, thirds, fourths, and fifths?

11. Is 10 a common denominator for halves, fourths, and fifths?

12. Is 12 a common denominator for halves, thirds, fourths, and sixths?

13. Is 8 a common denominator for halves, thirds, fourths, and eighths?



How Fractions Came to the Puppet Show

1. Jane and Ellen were busy dressing dolls. Jane said, "We used $\frac{1}{4}$ yd. of green satin, $\frac{1}{8}$ yd. of white velvet, and $\frac{1}{2}$ yd. of veiling to make the costume for the princess."

How much cloth did they use in all?

2. "It did not take as much cloth for the prince as for the princess," Ellen said. "We used only $\frac{1}{4}$ yd. of black satin and $\frac{1}{8}$ yd. of black velvet."

How much cloth did it take for the prince?

3. "The queen is dressed royally," Jane said. "We used $\frac{3}{8}$ yd. of black satin, $\frac{1}{4}$ yd. of purple velvet, and $\frac{1}{2}$ yd. of white velvet."

How much cloth was needed to dress the queen?

4. They had 325 tickets printed. When the show started, $\frac{4}{5}$ of the tickets had been sold. How many tickets had been sold?

5. The children had 280 chairs ready when the show started. About $\frac{1}{7}$ of the chairs were not filled. How many people came to the show?

Adding Mixed Numbers Is Easy

1. Elsie used $2\frac{3}{8}$ cups of water and $4\frac{1}{8}$ cups of milk in a pudding. How much milk and water together did she use?

Add the fractions. Write the sum $\frac{4}{8}$ under $\frac{1}{8}$.

Add the whole numbers. Write the sum 6 under 4.

Reduce the fraction $\frac{4}{8}$ to lowest terms. The answer is $6\frac{1}{2}$ cups.

$2\frac{3}{8}$
$4\frac{1}{8}$
$6\frac{4}{8} = 6\frac{1}{2}$

2. Add these mixed numbers:

$3\frac{1}{4}$	$1\frac{1}{3}$	$1\frac{1}{5}$	$1\frac{2}{9}$	$2\frac{3}{10}$	$18\frac{4}{7}$	$9\frac{2}{12}$
$2\frac{1}{4}$	$3\frac{1}{3}$	$6\frac{1}{5}$	$2\frac{1}{9}$	$7\frac{2}{10}$	$12\frac{1}{7}$	$8\frac{7}{12}$

3. Elsie made lemonade. She had 5 glasses of water in a pitcher and added $3\frac{3}{4}$ glasses to it. How many glasses did that make?

5
$3\frac{3}{4}$
$8\frac{3}{4}$

4. Add these whole numbers and mixed numbers:

15	$12\frac{1}{2}$	$7\frac{3}{4}$	124	$17\frac{5}{6}$
$12\frac{5}{8}$	24	4	$101\frac{4}{5}$	8

5. Elsie's mother bought $1\frac{1}{8}$ lb. of beef, $2\frac{3}{8}$ lb. of veal, and $\frac{1}{8}$ lb. of salt pork. She had it all ground together to make a meat loaf. How much meat did she buy in all?

Study the addition at the right.

Elsie's mother bought $3\frac{5}{8}$ lb. in all.

$1\frac{1}{8}$
$2\frac{3}{8}$
$\frac{1}{8}$
$3\frac{5}{8}$

Adding Fractions with Carrying

1. Mrs. Turner bought two pieces of dress goods. One piece was $1\frac{3}{4}$ yards long and the other piece was $7\frac{1}{4}$ yards long. How many yards were in the two pieces?

Add the fractions. The sum is $\frac{4}{4}$. You could write $\frac{4}{4}$ under $\frac{1}{4}$. But $\frac{4}{4}$ equals 1. It is better to carry the 1 in mind, and add it in with the whole numbers. The sum of the whole numbers, with the 1 carried, is 9.

$$1\frac{3}{4}$$
$$7\frac{1}{4}$$
$$8\frac{4}{4} = 9$$

2. Another day, Mrs. Turner bought $2\frac{5}{8}$ yards of dress goods in one piece and $4\frac{7}{8}$ yards in another piece. How many yards were in the two pieces?

Add the fractions. The sum is $\frac{12}{8}$. You could write $\frac{12}{8}$ under $\frac{7}{8}$. But $\frac{12}{8}$ equals $1\frac{4}{8}$ or $1\frac{1}{2}$. It is better to carry the 1 in mind and add it in with the whole numbers. The sum of the whole numbers, with the 1 carried, is 7.

$$2\frac{5}{8}$$
$$4\frac{7}{8}$$
$$7\frac{4}{8} = 7\frac{1}{2}$$

Copy and add. Leave each answer in best form.

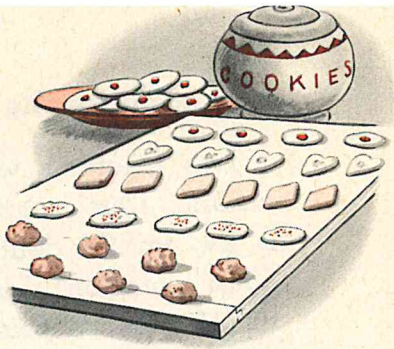
3.

$1\frac{2}{5}$	$6\frac{7}{8}$	$7\frac{9}{10}$	$14\frac{5}{12}$	$145\frac{7}{9}$	$8\frac{2}{3}$
$3\frac{4}{5}$	$2\frac{3}{8}$	$5\frac{5}{10}$	$10\frac{11}{12}$	$63\frac{8}{9}$	$9\frac{2}{3}$

4.

$1\frac{5}{6}$	$4\frac{3}{8}$	$9\frac{1}{2}$	$6\frac{2}{3}$	$7\frac{4}{5}$	$6\frac{7}{8}$
$4\frac{1}{6}$	$9\frac{5}{8}$	$2\frac{1}{2}$	$4\frac{1}{3}$	$2\frac{3}{5}$	$4\frac{3}{8}$
$3\frac{5}{6}$	$2\frac{3}{8}$	4	$9\frac{2}{3}$	$3\frac{3}{5}$	$6\frac{5}{8}$

Adding Mixed Numbers Having Unlike Fractions



Mrs. Brown is baking cookies for a church bake sale. Let us help her with her fractions and mixed numbers.

1. On Monday she baked $3\frac{1}{2}$ lb. of butter cookies and $4\frac{3}{8}$ lb. of molasses chews. How many pounds was this?

$3\frac{1}{2} = 3\frac{4}{8}$

$4\frac{3}{8} = 4\frac{3}{8}$

$7\frac{7}{8}$

The fractions must have a common denominator before they can be added. Rewrite $3\frac{1}{2}$ as $3\frac{4}{8}$. Write $4\frac{3}{8}$ under $3\frac{4}{8}$, and add. The sum is $7\frac{7}{8}$.

2. On Tuesday she baked $9\frac{3}{4}$ lb. of coconut bars, $2\frac{1}{2}$ lb. of chocolate brownies, and $5\frac{3}{8}$ lb. of fig bars. How many pounds did she bake that day?

$9\frac{3}{4} = 9\frac{6}{8}$

$2\frac{1}{2} = 2\frac{4}{8}$

$5\frac{3}{8} = 5\frac{3}{8}$

$16\frac{13}{8} = 17\frac{5}{8}$

The common denominator of the three fractions is 8. Rewrite the numbers to be added so that each fraction has 8 for denominator, and add them. The sum of the three fractions is $\frac{13}{8}$. Change this to a mixed number $1\frac{5}{8}$. Write the $\frac{5}{8}$ under $\frac{3}{8}$, and carry the 1. The sum of the whole numbers, with the 1 carried, is 17. The answer is $17\frac{5}{8}$ pounds.

Hunting for the Least Common Denominator

Two fractions will have many common denominators. One common denominator for $\frac{1}{4}$ and $\frac{1}{6}$ is 24, for 24 contains both 4 and 6 evenly. Another common denominator for $\frac{1}{4}$ and $\frac{1}{6}$ is 12, for 12 also contains both 4 and 6 evenly.

The least common denominator of two or more fractions is the smallest number that contains all the denominators evenly.

Study the additions below:

This way is all right

A. $\frac{1}{2} = \frac{12}{24}$

$\frac{2}{3} = \frac{16}{24}$

$\frac{3}{4} = \frac{18}{24}$

$\frac{46}{24} = 1\frac{22}{24} = 1\frac{11}{12}$

This way is better

B. $\frac{1}{2} = \frac{6}{12}$

$\frac{2}{3} = \frac{8}{12}$

$\frac{3}{4} = \frac{9}{12}$

$\frac{23}{12} = 1\frac{11}{12}$

Both ways are correct. In A we multiplied the three denominators together to find a common denominator. Using 24 as denominator made large numerators to be added, and made it necessary to reduce $\frac{22}{24}$ to lowest terms.

In B we had smaller numerators to add, and it was easier to reduce the answer to simplest form.

Before adding unlike fractions, try to find the least common denominator. There is no easy rule for finding it. You must hunt for it.

Here is a hint that is helpful in hunting for a least common denominator. Take the largest denominator of the fractions to be added, and multiply it by 2, then by 3, then by 4, and so on, until you come to a number that contains each of the other denominators. Consider the fractions: $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$. The largest denominator is 4. Since 4 does not contain both 2 and 3 evenly, multiply 4 by 2. 8 contains 4 and 2 evenly but does not contain 3. Try 3×4 or 12. 12 contains 2, 3, and 4 evenly, and is the least common denominator.

Find the least common denominator of:

1. $\frac{1}{2}, \frac{5}{6}, \frac{3}{8}$ **2.** $\frac{3}{4}, \frac{2}{3}, \frac{1}{6}$ **3.** $\frac{1}{3}, \frac{3}{4}, \frac{1}{12}$

In adding fractions, the first step is to find a common denominator. Next rewrite each fraction with this common denominator as its denominator. Add these fractions.

4.

$\frac{3}{8}$	$\frac{2}{3}$	$\frac{8}{9}$	$\frac{2}{5}$	$\frac{1}{2}$	$\frac{2}{3}$	$\frac{1}{3}$	$\frac{7}{12}$
$\frac{1}{2}$	$\frac{1}{2}$	$\frac{2}{3}$	$\frac{3}{4}$	$\frac{7}{10}$	$\frac{3}{4}$	$\frac{1}{5}$	$\frac{2}{3}$

5.

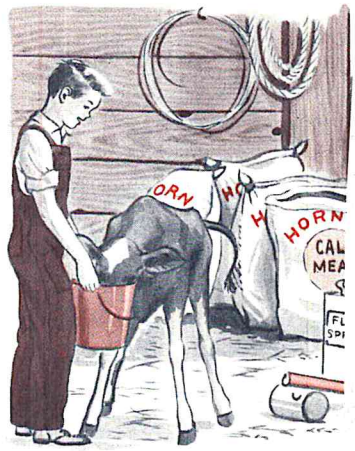
$\frac{5}{6}$	$\frac{1}{2}$	$\frac{4}{9}$	$\frac{7}{8}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{2}{3}$	$\frac{2}{5}$
$\frac{2}{3}$	$\frac{5}{6}$	$\frac{3}{4}$	$\frac{2}{3}$	$\frac{5}{6}$	$\frac{3}{4}$	$\frac{4}{7}$	$\frac{5}{6}$

6.

$2\frac{1}{4}$	$2\frac{1}{2}$	$4\frac{1}{4}$	$2\frac{5}{8}$	$2\frac{7}{8}$	$5\frac{3}{4}$
$2\frac{1}{2}$	$6\frac{7}{8}$	$9\frac{1}{2}$	$3\frac{1}{4}$	$8\frac{3}{4}$	$7\frac{1}{6}$
$5\frac{5}{12}$	$4\frac{11}{16}$	$7\frac{5}{8}$	$9\frac{5}{16}$	$7\frac{1}{2}$	$4\frac{7}{12}$

7. Mrs. Brown packed four boxes of mixed cookies. One box weighed $1\frac{3}{8}$ pounds, another weighed $1\frac{3}{4}$ pounds, another weighed $2\frac{1}{2}$ pounds, and the fourth weighed $1\frac{7}{8}$ pounds. How much did they all weigh?

Fractions from the Farmer's Barn



Jack and Jill live on a farm. Here are some of their farm problems:

1. Jack bought a little calf that weighed 56 lb. When he weighed it later he said it weighed $3\frac{7}{8}$ times as much as when he got it. What does the calf now weigh?

2. Jack buys Horner's Calf Meal for his calf. It comes in 50-lb. sacks. If there are about $3\frac{4}{5}$ sacks left, how many pounds would this be?

3. A 5-gallon can of cattle fly spray costs $3.75. At this rate, how much does 1 gallon cost?

4. Jill puts 14 eggs under each setting hen. If she has 6 setting hens, how many little chicks may she have if $\frac{3}{4}$ of the eggs hatched?

5. Jack had some setting hens, too. They hatched 168 chicks. It turned very cold and $\frac{1}{6}$ of his chicks died. How many did he lose?

6. Jill gathered the eggs each day. Monday she gathered $16\frac{1}{4}$ doz., Tuesday $15\frac{1}{2}$ doz., and Wednesday $17\frac{1}{3}$ doz. How many dozen did she gather in all?

7. Jill sold some eggs to a neighbor. She sold $8\frac{3}{4}$ doz. at $.24 a dozen. What did she get for the eggs?

Finding Least Common Denominators

Find the least common denominators and add:

1.

$\frac{3}{4}$	$\frac{2}{3}$	$\frac{5}{8}$	$\frac{7}{12}$	$\frac{8}{9}$	$\frac{2}{3}$
$\frac{5}{6}$	$\frac{5}{6}$	$\frac{2}{3}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{7}{12}$
$\frac{1}{2}$	$\frac{4}{9}$	$\frac{5}{6}$	$\frac{2}{3}$	$\frac{2}{3}$	$\frac{5}{8}$

2.

$4\frac{3}{4}$	$5\frac{1}{2}$	$7\frac{5}{9}$	$9\frac{3}{8}$	$4\frac{5}{6}$	$11\frac{5}{12}$
$2\frac{2}{3}$	$7\frac{5}{6}$	$6\frac{1}{3}$	$3\frac{1}{6}$	$7\frac{2}{3}$	$10\frac{1}{2}$
$5\frac{5}{6}$	$4\frac{4}{9}$	$6\frac{1}{2}$	$9\frac{2}{3}$	$3\frac{5}{9}$	$15\frac{7}{8}$

3. Mrs. Frank baked some fruit cakes. She used $3\frac{1}{2}$ lb. of pecans, $2\frac{3}{8}$ lb. of walnuts, and $1\frac{3}{4}$ lb. of almonds. How many pounds of nuts did she use?

4. She measured $3\frac{1}{2}$ lb. of brown sugar, $2\frac{1}{4}$ lb. of white sugar, and $\frac{5}{8}$ lb. of powdered sugar. How many pounds of sugar was this?

Give the least common denominator for each of the following. Then add. Reduce each answer to lowest terms.

5.

$2\frac{3}{4}$	$2\frac{2}{3}$	$4\frac{1}{2}$	$8\frac{1}{4}$	$4\frac{5}{6}$	$2\frac{4}{5}$	$7\frac{2}{9}$
$1\frac{5}{6}$	$3\frac{4}{9}$	$2\frac{2}{3}$	$3\frac{2}{3}$	$2\frac{7}{8}$	$3\frac{1}{2}$	$8\frac{1}{2}$

6.

$3\frac{3}{4}$	$4\frac{1}{2}$	$3\frac{5}{6}$	$5\frac{7}{16}$	$3\frac{5}{6}$	$5\frac{3}{4}$	$8\frac{7}{12}$
$2\frac{1}{2}$	$2\frac{2}{3}$	$4\frac{1}{2}$	$2\frac{3}{8}$	$2\frac{1}{4}$	$2\frac{5}{8}$	$2\frac{1}{2}$
$4\frac{3}{5}$	$3\frac{3}{4}$	$3\frac{3}{4}$	$4\frac{3}{4}$	$3\frac{5}{8}$	$9\frac{5}{16}$	$3\frac{2}{3}$

7.

$4\frac{5}{6}$	$3\frac{1}{3}$	$6\frac{3}{4}$	$3\frac{4}{5}$	$8\frac{1}{3}$	$4\frac{2}{3}$	$3\frac{1}{2}$
$3\frac{1}{2}$	$4\frac{4}{5}$	$2\frac{7}{12}$	$2\frac{7}{10}$	$2\frac{5}{6}$	$6\frac{3}{4}$	$7\frac{2}{3}$
$2\frac{5}{9}$	$2\frac{8}{15}$	$8\frac{5}{8}$	$3\frac{3}{4}$	$4\frac{7}{8}$	$7\frac{5}{8}$	$8\frac{4}{9}$

A Farmer Needs Arithmetic

Joe and John are visiting Uncle Tom's farm. It has 360 acres in it.

1. Uncle Tom had $\frac{3}{8}$ of his farm in corn last year. How many acres did he have in corn?

2. The Golden Bantam sweet corn is ready to eat 84 days after it is planted. How many weeks is that?

3. The Tom Thumb popcorn is ripe 105 days after it is planted. How many weeks is that? About how many months is it? You can count 30 days to the month.

4. Uncle Tom had $\frac{5}{12}$ of his farm in oats last year. How many acres did he have in oats?

5. He raised an average of $35\frac{1}{2}$ bushels of oats to the acre last year. How many bushels did he raise in all?

6. He raised an average of $29\frac{3}{8}$ bushels of corn to the acre last year. How many bushels of corn did he raise last year? (See problem 1.)

7. The land around Uncle Tom's house is a rectangle 20 rods wide and 30 rods long. How many rods of wire are needed around this land?

8. Uncle Tom sold 125 gallons of cherries at 40¢ a gallon. How much did he get?

First Call to the Rifle Range

Section I. Reduce each fraction to lowest terms:

$\frac{4}{6}$ $\frac{5}{10}$ $\frac{8}{12}$ $\frac{6}{9}$ $\frac{10}{16}$ $\frac{9}{12}$ $\frac{10}{12}$ $\frac{6}{8}$ $\frac{4}{12}$

Section II. Change to mixed numbers. Reduce each fraction to lowest terms.

$\frac{7}{6}$ $\frac{5}{3}$ $\frac{7}{4}$ $\frac{10}{7}$ $\frac{7}{5}$ $\frac{12}{8}$ $\frac{10}{6}$ $\frac{14}{12}$ $\frac{9}{8}$

Section III. Write the answers.

A. $\frac{1}{2}$ of 16 $\frac{1}{3}$ of 21 $\frac{1}{4}$ of 32 $\frac{1}{5}$ of 85

B. $\frac{2}{3}$ of 36 $\frac{3}{4}$ of 60 $\frac{2}{5}$ of 75 $\frac{5}{6}$ of 72

Section IV. Add. Leave answers in best form.

A.

$$\begin{array}{rrrrrrrrr} \frac{1}{3} & \frac{3}{7} & \frac{3}{8} & \frac{7}{9} & \frac{1}{2} & \frac{1}{3} & \frac{1}{2} & \frac{1}{2} & \frac{5}{12} \\ \frac{1}{3} & \frac{2}{7} & \frac{5}{8} & \frac{5}{9} & \frac{1}{4} & \frac{1}{6} & \frac{3}{4} & \frac{5}{6} & \frac{1}{3} \\ \hline \end{array}$$

B.

$$\begin{array}{rrrrrrrrr} \frac{1}{3} & \frac{5}{6} & \frac{3}{4} & \frac{5}{9} & \frac{1}{12} & \frac{1}{5} & \frac{7}{8} & \frac{1}{2} & \frac{1}{6} \\ \frac{5}{6} & \frac{3}{4} & \frac{1}{2} & \frac{2}{3} & \frac{5}{6} & \frac{7}{10} & \frac{2}{3} & \frac{4}{5} & \frac{2}{3} \\ \frac{1}{4} & \frac{3}{8} & \frac{7}{8} & \frac{1}{2} & \frac{2}{3} & \frac{1}{2} & \frac{11}{12} & \frac{1}{2} & \frac{1}{4} \\ \hline \end{array}$$

Section V. Solve. Leave answers in best form.

A. A rope $15\frac{3}{4}$ feet long is tied to another rope $15\frac{2}{3}$ feet long. How long are the two ropes?

B. Three bags of potatoes weigh $18\frac{3}{4}$ lb., $23\frac{5}{8}$ lb., and $21\frac{1}{2}$ lb. Find the total weight.

You had 46 shots. If you hit 42 bulls-eyes, or more, work page 243. Others will work page 242.

Second Call to the Rifle Range

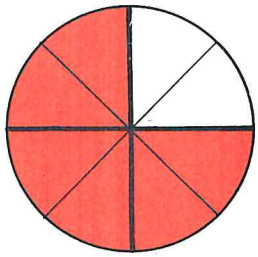
Stop at the end of each section. Put answers on the blackboard, and mark your papers with a red crayon.

Section I. Write the number that belongs in place of the $*$ or that answers the question:

1. The heavy lines divide the circle into $*$.

2. The heavy and light lines together divide the circle into $*$.

3. How many fourths are in the whole circle?



4. How many eighths are in the whole circle?

5. How many fourths of the circle are shaded?

Section II. Look at the circle and write the number that belongs in place of each $*$:

$\frac{1}{2} = \frac{*}{8}$ $\quad \frac{1}{4} = \frac{*}{8}$ $\quad \frac{1}{2} = \frac{*}{4}$ $\quad \frac{3}{4} = \frac{*}{8}$

Section III. Add. Leave answers in best form.

$\frac{3}{8}$	$\frac{1}{2}$	$\frac{2}{3}$	$\frac{5}{6}$	$\frac{3}{12}$	$\frac{3}{5}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{5}{8}$
$\frac{3}{4}$	$\frac{3}{4}$	$\frac{4}{9}$	$\frac{1}{2}$	$\frac{2}{3}$	$\frac{7}{10}$	$\frac{2}{3}$	$\frac{7}{16}$	$\frac{1}{2}$

You had 18 shots on this page. If you hit at least 17 bulls-eyes, you are a sharpshooter.

Sharpshooters Attack Equivalent Fractions

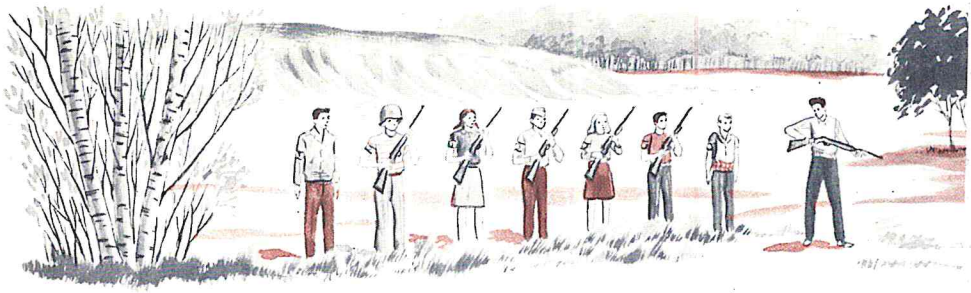
Look in your dictionary for the meaning of the word **equivalent.**

We say that $\frac{1}{2}$, $\frac{2}{4}$, $\frac{4}{8}$, and $\frac{8}{16}$ are all **equivalent fractions.** Their values are the same.

Get a large sheet of wrapping paper or a large piece of cardboard and make a chart like the one started below. All the sharpshooters can work together in making this chart for the whole room to use. On the chart below, a number is missing wherever there is a $*$. You will put these numbers in on your chart.

Chart Showing Equivalent Fractions

Fraction	Equivalent Fractions							
	Fourths	Sixths	Eighths	Ninths	Tenths	Twelfths	Fifteenths	Sixteenths
$\frac{1}{2}$	$\frac{2}{4}$	$\frac{3}{6}$	$\frac{4}{8}$		$\frac{5}{10}$	$\frac{*}{12}$		$\frac{*}{16}$
$\frac{1}{3}$		$\frac{2}{6}$		$\frac{*}{9}$		$\frac{*}{12}$	$\frac{*}{15}$	
$\frac{1}{4}$			$\frac{*}{8}$			$\frac{*}{12}$		$\frac{*}{16}$
$\frac{1}{5}$					$\frac{*}{10}$		$\frac{*}{15}$	
$\frac{1}{6}$						$\frac{*}{12}$		
$\frac{1}{8}$								$\frac{*}{16}$
$\frac{2}{3}$		$\frac{*}{6}$		$\frac{*}{9}$		$\frac{*}{12}$	$\frac{*}{15}$	
$\frac{3}{4}$			$\frac{*}{8}$			$\frac{*}{12}$		$\frac{*}{16}$



Dress Parade—Review of Unit 9

All pupils will do this page.

Which of each pair of fractions is the greater? Write the answer only.

1. $\frac{1}{8}$ or $\frac{1}{4}$ $\quad$ $\frac{1}{6}$ or $\frac{1}{8}$ $\quad$ $\frac{1}{4}$ or $\frac{1}{2}$ $\quad$ $\frac{1}{4}$ or $\frac{1}{6}$

2. $\frac{3}{8}$ or $\frac{1}{2}$ $\quad$ $\frac{3}{8}$ or $\frac{1}{4}$ $\quad$ $\frac{5}{6}$ or $\frac{2}{3}$ $\quad$ $\frac{7}{8}$ or $\frac{3}{4}$

Write the number that belongs in place of each $*$:

3. $\frac{1}{2} = \frac{*}{4} = \frac{*}{8} = \frac{*}{6}$ $\quad$ $\frac{1}{3} = \frac{*}{6} = \frac{*}{9} = \frac{*}{12}$

4. $\frac{2}{3} = \frac{*}{6} = \frac{*}{9} = \frac{*}{12}$ $\quad$ $\frac{3}{4} = \frac{*}{8} = \frac{*}{12} = \frac{*}{16}$

Change to mixed numbers. Leave each answer in best form.

5. $\frac{9}{8}$ $\quad$ $\frac{3}{2}$ $\quad$ $\frac{13}{5}$ $\quad$ $\frac{6}{5}$ $\quad$ $\frac{4}{3}$ $\quad$ $\frac{9}{2}$ $\quad$ $\frac{5}{4}$ $\quad$ $\frac{18}{8}$

Write the answers:

6. $\frac{1}{6}$ of 24 $\quad$ $\frac{1}{5}$ of 45 $\quad$ $\frac{1}{2}$ of 38 $\quad$ $\frac{1}{9}$ of 36

7. $\frac{3}{4}$ of 40 $\quad$ $\frac{5}{9}$ of 36 $\quad$ $\frac{4}{5}$ of 20 $\quad$ $\frac{11}{12}$ of 24

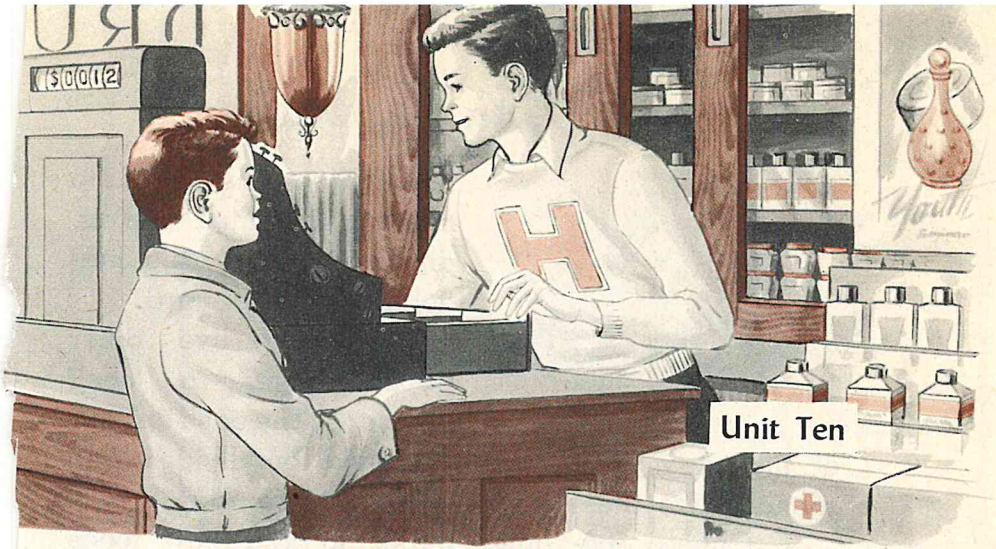
Add. Leave all answers in best form.

8.

$\frac{1}{2}$	$\frac{3}{5}$	$\frac{4}{5}$	$\frac{3}{8}$	$\frac{4}{9}$	$\frac{7}{8}$	$\frac{3}{4}$	$\frac{5}{12}$	$\frac{7}{16}$
$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{2}{3}$	$\frac{3}{4}$	$\frac{1}{2}$
$\frac{5}{8}$	$\frac{3}{10}$	$\frac{9}{10}$	$\frac{5}{6}$	$\frac{2}{3}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{2}{3}$	$\frac{7}{8}$

9.

$5\frac{1}{2}$	$6\frac{2}{3}$	$8\frac{3}{4}$	$9\frac{1}{12}$	$6\frac{1}{10}$	$123\frac{4}{5}$
$3\frac{5}{8}$	$7\frac{1}{3}$	$6\frac{1}{2}$	$6\frac{5}{12}$	$4\frac{3}{5}$	$101\frac{1}{2}$
$7\frac{3}{4}$	$9\frac{5}{6}$	$5\frac{2}{3}$	$7\frac{1}{6}$	$8\frac{1}{2}$	$15\frac{7}{10}$



Making Change

DICK: I have to give every customer the right change, or Mr. Hall wouldn't let me work for him.

HARRY: Do you have to use a pencil to subtract?

DICK: I don't subtract. I add.

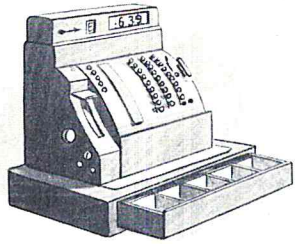
1. Mrs. Brown bought a tube of tooth paste for 39¢ and gave me a half dollar. I gave her a penny to make 40 cents and a dime to make 50 cents.

2. Mary bought a 6-cent stamp and gave me a quarter. I added 4 cents to make 10 cents, then a dime and a nickel to make 25 cents.

3. Mr. Blake bought a comb for 12 cents, and gave me two dimes. I counted out 3¢ to make 15¢ and then a nickel to make 20¢.

4. Earl bought a bag of caramels for 19¢, and gave me 25¢. Make change.

Three Jobs for Good Workers



1. Choose five pupils to make toy pennies, nickels, dimes, quarters, and half dollars of cardboard.

2. Choose five other pupils to make a "cash register." The cash drawer of the play cash register should be divided into sections like those in the real cash register.

3. Choose five other pupils to find how foods are sold (by the pound, dozen, quart, etc.) and to find prices. These pupils can study advertisements or go to the store. Have them put a price list of such articles as the following on the blackboard.

Tea	Minced ham	Steak	Oranges
Coffee	Pork chops	Roast	Apples
Sugar	Navy beans	Bacon	Bananas
Rolls	Dried prunes	Oysters	Cabbage
Butter	Dried apricots	Lard	Turnips

Work for the Whole Class

Use the list above.

4. Buy anything you think would be good for a supper for five. Buy enough but not too much. Nothing must be wasted.

5. Choose food you like and buy enough for dinner for your family.

6. Buy several single items as $2\frac{3}{4}$ lb. of chops, $1\frac{1}{2}$ dozen oranges, or $3\frac{1}{4}$ lb. of cabbage.

A Wise Shopper Counts His Change

The storekeeper must know how to make change. It is very important that the customer be able to count change. Why? Do you always count your change before leaving the counter?

To check change begin with the amount of your purchase. Add to this amount each coin as the storekeeper gives it to you. The last sum should be the amount you gave to the storekeeper.

You give the storekeeper $1. What change would you expect to receive from these purchases? Name the coins in the order he would give them to you.

1. 83¢ 54¢ 93¢ 27¢ 34¢ 56¢ 45¢ 75¢

2. 23¢ 65¢ 15¢ 67¢ 35¢ 29¢ 39¢ 59¢

3. Count the change for each of the following grocery orders, if paid for with a 5-dollar bill.

soap	15¢	tea	63¢	bread	9¢
oranges	55¢	meat	$2.35	flour	$1.65

The Game of Clerk and Customer

Choose a clerk. The rest will be customers. The customers will take turns buying things.

The customer will say: "I want to buy . . . . "

The clerk will say: "Your bill is . . . . "

The customer will say: "Here is a dollar (or quarter, half dollar, twenty cents, five dollars, or any amount the customer chooses)."

The clerk will then count out the change.

Subtracting Like Fractions

1. Mary had 5 oranges. She gave 1 orange to Alice. How many oranges did Mary have?

2. Jack folded a strip of paper into 5 fifths. He cut 1 fifth off. How many fifths did he have left?

3. Mary had five apples. She ate two of them. How many did she have left?

4. Jack folded a piece of red paper into 5 fifths. He cut off 2 fifths. How many fifths were left in the strip?

You subtract the numbers that tell how many there are.

5 oranges
−1 orange
4 oranges

5 fifths → $\frac{5}{5}$
−1 fifth → $\frac{1}{5}$
4 fifths → $\frac{4}{5}$

5 apples
−2 apples
3 apples

5 fifths → $\frac{5}{5}$
−2 fifths → $\frac{2}{5}$
3 fifths → $\frac{3}{5}$

Scissors and Subtraction

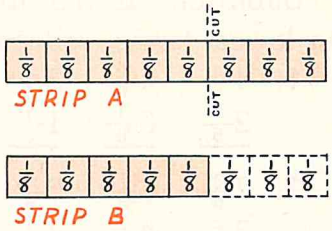
To subtract like fractions, subtract the numerators. The denominators do not change.

The rule for adding like fractions is given on page 204. Compare the rule for adding fractions with the rule for subtracting fractions.

We will fold and cut strips of paper just as Jack did on page 248. This will help you to see exactly what the rule for subtracting fractions means.

1. Fold a strip of paper into 8 equal sections.

Each section is what part of the whole strip? What is each section called? If I cut off 3 sections, what part of the strip have I cut off?



8 sections − 3 sections = 5 sections

8 eighths − 3 eighths = 5 eighths, or $\frac{8}{8} - \frac{3}{8} = \frac{5}{8}$

2. Use folding and cutting to prove that

$$\frac{5}{8} - \frac{3}{8} = \frac{2}{8}$$

3. Use folding and cutting to prove that

$$\frac{5}{6} - \frac{1}{6} = \frac{4}{6}$$

Subtract.

4.

$\frac{4}{5}$	$\frac{7}{8}$	$\frac{11}{12}$	$\frac{2}{3}$	$\frac{6}{7}$	$\frac{9}{10}$	$\frac{3}{4}$	$\frac{5}{6}$	$\frac{7}{9}$
$\frac{1}{5}$	$\frac{3}{8}$	$\frac{7}{12}$	$\frac{1}{3}$	$\frac{5}{7}$	$\frac{3}{10}$	$\frac{2}{4}$	$\frac{4}{6}$	$\frac{2}{9}$

5.

$\frac{6}{8}$	$\frac{2}{3}$	$\frac{8}{9}$	$\frac{4}{5}$	$\frac{3}{4}$	$\frac{4}{7}$	$\frac{5}{6}$	$\frac{3}{6}$	$\frac{5}{9}$
$\frac{3}{8}$	$\frac{1}{3}$	$\frac{3}{9}$	$\frac{2}{5}$	$\frac{1}{4}$	$\frac{1}{7}$	$\frac{2}{6}$	$\frac{2}{6}$	$\frac{1}{9}$

Subtracting Mixed Numbers with Like Fractions

Mrs. Rose had $16\frac{2}{3}$ yards of lace. She used $2\frac{1}{3}$ yards of it. How many yards did she have left?

Subtract the fractions first: $\frac{1}{3}$ from $\frac{2}{3}$ leaves $\frac{1}{3}$. Write the remainder $\frac{1}{3}$ under $\frac{1}{3}$.

Subtract the whole numbers: 2 from 16 leaves 14. Write 14.

The answer is $14\frac{1}{3}$ yards.

$16\frac{2}{3}$ yards
$2\frac{1}{3}$ yards
$14\frac{1}{3}$ yards

Subtract. If the fraction in an answer is not in lowest terms, reduce it to lowest terms.

1.	$4\frac{4}{5}$	$4\frac{2}{6}$	$3\frac{2}{3}$	$6\frac{7}{8}$	$9\frac{4}{7}$	$12\frac{3}{4}$	$56\frac{7}{9}$
	$2\frac{3}{5}$	$3\frac{1}{6}$	$1\frac{1}{3}$	$4\frac{7}{8}$	$6\frac{2}{7}$	$10\frac{2}{4}$	$34\frac{5}{9}$
2.	$7\frac{3}{5}$	$6\frac{7}{8}$	$5\frac{1}{8}$	$3\frac{9}{10}$	$7\frac{7}{12}$	$14\frac{11}{12}$	$79\frac{1}{2}$
	$3\frac{2}{5}$	$4\frac{2}{8}$	$4\frac{1}{8}$	$1\frac{2}{10}$	$5\frac{2}{12}$	$11\frac{4}{12}$	$65\frac{1}{2}$
3.	$6\frac{7}{8}$	$5\frac{5}{6}$	$6\frac{7}{9}$	$4\frac{2}{3}$	$8\frac{11}{12}$	$15\frac{3}{4}$	$73\frac{9}{12}$
	$3\frac{5}{8}$	$2\frac{3}{6}$	$1\frac{4}{9}$	$4\frac{1}{3}$	$5\frac{3}{12}$	$13\frac{1}{4}$	$52\frac{5}{12}$
4.	$1\frac{3}{4}$	$2\frac{7}{8}$	$3\frac{5}{6}$	$1\frac{3}{5}$	$6\frac{1}{4}$	$7\frac{3}{8}$	$8\frac{7}{8}$
	$\frac{2}{4}$	$2\frac{5}{8}$	$1\frac{3}{6}$	$\frac{3}{5}$	$2\frac{1}{4}$	$\frac{3}{8}$	$2\frac{3}{8}$
5.	$8\frac{1}{3}$	$5\frac{5}{6}$	$9\frac{3}{4}$	$8\frac{1}{5}$	$6\frac{7}{8}$	$2\frac{1}{4}$	$4\frac{4}{5}$
	8	$\frac{3}{6}$	$9\frac{1}{4}$	2	$6\frac{5}{8}$	$2\frac{1}{4}$	$\frac{1}{5}$
6.	$2\frac{6}{8}$	$3\frac{8}{9}$	$5\frac{11}{12}$	$4\frac{9}{10}$	$3\frac{5}{8}$	$7\frac{7}{9}$	$3\frac{5}{8}$
	$1\frac{1}{8}$	$1\frac{3}{9}$	$2\frac{5}{12}$	$1\frac{5}{10}$	$2\frac{2}{8}$	$3\frac{3}{9}$	$2\frac{1}{8}$

To make sure that you do not forget how to add mixed numbers, add examples 1 through 6 above.

Winning by a Fraction

Last summer at camp we had a track meet on Visitors' Day.

1. In the high jump, Jimmy jumped $3\frac{3}{4}$ ft. and Donald jumped $2\frac{1}{4}$ ft. How much higher did Jimmy jump?

2. In the broad jump, Harry jumped $4\frac{5}{6}$ ft. and George jumped $3\frac{1}{6}$ ft. How much farther did Harry jump than George?

3. In the hop, step, and jump, Joe's record was $2\frac{1}{6}$ ft., $4\frac{2}{6}$ ft., and $4\frac{1}{6}$ ft. What was his total score in this event?

4. Ed's record in the hop, step, and jump was $2\frac{5}{6}$ ft., $5\frac{1}{6}$ ft., and $4\frac{5}{6}$ ft. What was his total score in this event?

5. How much better was Ed's record than Joe's?

6. In the 50-yd. dash, Jimmy's record was $13\frac{3}{5}$ sec. and Harry's was $12\frac{1}{5}$ sec. How many seconds less than Jimmy did Harry take to run the 50-yd. dash?

7. In the relay race the four boys on the Red Team took $3\frac{4}{5}$ sec., $3\frac{3}{5}$ sec., $2\frac{4}{5}$ sec., and $3\frac{2}{5}$ sec. How long did it take the Reds to complete the relay race?

8. In the same race the boys on the White Team took $3\frac{2}{5}$ sec., $4\frac{1}{5}$ sec., $2\frac{4}{5}$ sec., and $3\frac{2}{5}$ sec. How long did it take this team to complete the race?

9. Which team won? By how many seconds?

Can You Find the Squares That Are Not Magic?

Look at the magic squares on page 34. You will see that a square which is really magic gives you the same answer when you add across, up and down, or from corner to corner. Test these squares and find which are not magic.

Remember that fractions must have like denominators before you can add them.

1.

$\frac{8}{16}$	$\frac{3}{16}$	$\frac{4}{16}$
$\frac{1}{16}$	$\frac{5}{16}$	$\frac{9}{16}$
$\frac{6}{16}$	$\frac{7}{16}$	$\frac{2}{16}$

2.

$\frac{6}{10}$	$\frac{9}{10}$	$\frac{6}{10}$
$\frac{7}{10}$	$\frac{7}{10}$	$\frac{7}{10}$
$\frac{8}{10}$	$\frac{5}{10}$	$\frac{8}{10}$

3.

$\frac{4}{5}$	$\frac{1}{10}$	$\frac{3}{5}$
$\frac{3}{10}$	$\frac{1}{2}$	$\frac{7}{10}$
$\frac{2}{5}$	$\frac{9}{10}$	$\frac{1}{5}$

4.

$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$\frac{3}{4}$
$\frac{3}{4}$	$\frac{7}{8}$	$\frac{3}{4}$	$\frac{5}{8}$
$\frac{5}{8}$	$\frac{1}{2}$	$\frac{7}{8}$	$\frac{8}{8}$
$\frac{8}{8}$	$\frac{7}{8}$	$\frac{1}{2}$	$\frac{5}{8}$

5.

$\frac{1}{4}$	$\frac{1}{2}$	$\frac{5}{12}$	$\frac{1}{3}$
$\frac{1}{3}$	$\frac{1}{2}$	$\frac{1}{6}$	$\frac{1}{2}$
$\frac{1}{4}$	$\frac{1}{3}$	$\frac{1}{2}$	$\frac{5}{12}$
$\frac{2}{3}$	$\frac{1}{6}$	$\frac{5}{12}$	$\frac{1}{4}$

6.

$\frac{1}{2}$	1	$\frac{1}{2}$	$\frac{2}{3}$
$\frac{5}{6}$	$\frac{2}{3}$	$\frac{2}{3}$	$\frac{1}{2}$
$\frac{2}{3}$	$\frac{2}{3}$	$\frac{2}{3}$	$\frac{2}{3}$
$\frac{2}{3}$	$\frac{1}{3}$	$\frac{5}{6}$	$\frac{5}{6}$

7.

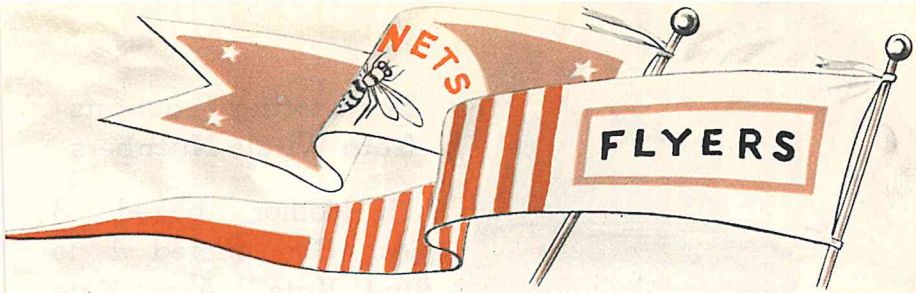
$\frac{7}{9}$	$\frac{4}{9}$	$\frac{8}{9}$	$\frac{2}{3}$
$\frac{2}{3}$	$\frac{7}{9}$	$\frac{5}{9}$	$\frac{7}{9}$
$\frac{5}{9}$	$\frac{7}{9}$	$\frac{5}{9}$	$\frac{2}{3}$
$\frac{7}{9}$	$\frac{2}{3}$	$\frac{2}{3}$	$\frac{2}{3}$

8.

$\frac{1}{6}$	$\frac{1}{2}$	$\frac{5}{12}$	$\frac{1}{3}$
$\frac{1}{3}$	$\frac{5}{12}$	$\frac{5}{12}$	$\frac{1}{4}$
$\frac{7}{12}$	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{1}{4}$
$\frac{1}{3}$	$\frac{1}{6}$	$\frac{1}{3}$	$\frac{7}{12}$

9.

$\frac{1}{6}$	$\frac{2}{3}$	$\frac{1}{4}$	$\frac{7}{12}$
$\frac{2}{3}$	$\frac{1}{4}$	$\frac{7}{12}$	$\frac{1}{6}$
$\frac{2}{3}$	$\frac{1}{3}$	$\frac{1}{2}$	$\frac{1}{6}$
$\frac{1}{6}$	$\frac{5}{12}$	$\frac{1}{3}$	$\frac{3}{4}$



Pennant Races with Mixed Practice

Choose a captain for each row of pupils. After each section check. The row having the largest number of perfect papers wins.

Race I. Write the sums. Check by adding in the opposite direction.

	23				
	16	867	1,665		$14.02
	45	23	1,329		.32
6	26	13,982	465	3,085	1.48
3	83	3,472	32	9,468	36.00

Race II. Subtract and check:

460	6,587	4,637	6,390	1,111	$40.10
389	1,006	3,798	4,063	990	.54

Race III. Multiply. Check by going over your work.

9	578	1,090	1,900	467	869	6,309
7	35	42	40	104	487	38

Race IV. Divide and check:

1. $4\overline{)640}$ $12\overline{)6,192}$ $73\overline{)10,298}$ $36\overline{)72,000}$
2. $60,286 \div 86$ $408,156 \div 43$ $138,092 \div 23$
3. $213\overline{)1,278}$ $521\overline{)16,679}$ $743\overline{)461,415}$

Subtracting Fractions from Whole Numbers

1. Mother baked 3 pies. She offered 1 to Aunt Kate. Aunt Kate said she would be glad to have $\frac{3}{4}$ of a pie. How much pie will be left?

Notice that Mother is cutting one of the pies into fourths. She must do this to give Aunt Kate $\frac{3}{4}$ pie. Notice, too, in the subtraction below that we must think of 1 pie as cut into fourths.

In A we have no fourths from which to subtract $\frac{3}{4}$. We borrow 1 whole from 3 and cut the 1 whole into $\frac{4}{4}$. Thus 3 is written as $2\frac{4}{4}$.

Subtract $\frac{3}{4}$ from $\frac{4}{4}$. Write the remainder $\frac{1}{4}$ under $\frac{3}{4}$.

The answer is $2\frac{1}{4}$ pies are left.

A	B
$3 = 2\frac{4}{4}$	
$-\frac{3}{4} = -\frac{3}{4}$	
	$2\frac{1}{4}$

Look at the picture again. When Mother gives Aunt Kate $\frac{3}{4}$ pie, will Mother have $2\frac{1}{4}$ pies left?

Copy and subtract.

2.

4	7	3	9	11	15	57
$\frac{1}{2}$	$\frac{7}{8}$	$\frac{3}{4}$	$\frac{7}{10}$	$\frac{2}{5}$	$\frac{5}{12}$	$\frac{4}{9}$

3.

7	3	9	5	32	45	17
$\frac{1}{3}$	$\frac{3}{7}$	$\frac{5}{8}$	$\frac{5}{6}$	$\frac{2}{7}$	$\frac{7}{12}$	$\frac{3}{8}$

4.

4	9	4	7	34	78	24
$\frac{3}{8}$	$\frac{5}{6}$	$\frac{7}{10}$	$\frac{5}{12}$	$\frac{2}{3}$	$\frac{4}{9}$	$\frac{4}{7}$

Subtracting Mixed Numbers from Whole Numbers

1. Father is mending the fence. He cut $3\frac{5}{6}$ feet from a board 12 feet long. How long is the piece of wood that is left?

A		B
12	=	$11\frac{6}{6}$
$3\frac{5}{6}$	=	$3\frac{5}{6}$
		$8\frac{1}{6}$

In A we have no sixths from which to subtract $\frac{5}{6}$. We borrow 1 whole from 12 and cut the whole into $\frac{6}{6}$. The 12 is then written as $11\frac{6}{6}$.

Subtract $\frac{5}{6}$ from $\frac{6}{6}$, and write the remainder $\frac{1}{6}$ under $\frac{5}{6}$. Subtract 3 from 11, and write the remainder **8** under 3. The answer is $8\frac{1}{6}$ feet.

2. How much is left if you cut $1\frac{1}{3}$ feet from an 8-foot board?

Copy and subtract:

3.	6 $2\frac{1}{2}$	8 $4\frac{1}{6}$	9 $3\frac{5}{8}$	15 $6\frac{7}{8}$	234 $65\frac{5}{9}$	546 $372\frac{7}{12}$
4.	23 $11\frac{4}{5}$	35 $31\frac{1}{12}$	76 $52\frac{3}{8}$	98 $87\frac{1}{9}$	982 $352\frac{2}{3}$	678 $253\frac{1}{8}$
5.	8 $2\frac{1}{8}$	56 $10\frac{1}{3}$	8 $1\frac{3}{4}$	57 $16\frac{5}{6}$	173 $28\frac{1}{4}$	615 $38\frac{2}{3}$
6.	7 $4\frac{1}{2}$	20 $11\frac{1}{6}$	15 $5\frac{5}{8}$	14 $3\frac{2}{3}$	25 $18\frac{1}{4}$	17 $9\frac{7}{8}$

Subtracting Fractions or Mixed Numbers from Mixed Numbers

1. The butcher had a beef roast that weighed $7\frac{1}{4}$ pounds. He cut off a smaller roast that weighed $3\frac{3}{4}$ pounds. How much was left?

In A we cannot take $\frac{3}{4}$ from $\frac{1}{4}$. We borrow 1 whole from 7, and cut the 1 whole into $\frac{4}{4}$. The $7\frac{1}{4}$ may then be written as $6\frac{5}{4}$.

In B subtract $\frac{3}{4}$ from $\frac{5}{4}$. Write the remainder $\frac{2}{4}$ under $\frac{3}{4}$. Subtract 3 from 6.

The answer is $3\frac{2}{4}$ or $3\frac{1}{2}$ pounds.

A	B
$7\frac{1}{4} = 6\frac{5}{4}$	
$3\frac{3}{4}$	$3\frac{3}{4}$
	$3\frac{2}{4} = 3\frac{1}{2}$

Find how many pounds of meat are left after the butcher has cut off each customer's order.

	Weight of Piece	Customer's Order
2.	$9\frac{5}{8}$ lb. of bacon	$2\frac{7}{8}$ lb. of bacon
3.	3 lb. of steak	$1\frac{1}{4}$ lb. of steak
4.	$8\frac{5}{16}$ lb. pork shoulder	$4\frac{9}{16}$ lb. pork shoulder

Copy and subtract. Check by adding.

5.	$5\frac{2}{5}$	$8\frac{1}{4}$	$5\frac{1}{6}$	$7\frac{3}{10}$	$2\frac{5}{12}$	$4\frac{3}{7}$	$5\frac{1}{3}$
	$3\frac{3}{5}$	$\frac{3}{4}$	$2\frac{5}{6}$	$\frac{7}{10}$	$1\frac{7}{12}$	$3\frac{5}{7}$	$2\frac{2}{3}$
6.	$6\frac{3}{8}$	$8\frac{4}{8}$	$2\frac{1}{3}$	$7\frac{2}{9}$	$4\frac{5}{16}$	$6\frac{3}{5}$	$5\frac{1}{4}$
	$3\frac{4}{8}$	$2\frac{7}{8}$	$\frac{2}{3}$	$\frac{7}{9}$	$3\frac{8}{16}$	$4\frac{4}{5}$	$3\frac{2}{4}$
7.	$6\frac{5}{8}$	$4\frac{3}{5}$	$6\frac{1}{6}$	$8\frac{4}{9}$	$6\frac{1}{3}$	$8\frac{2}{4}$	$9\frac{5}{12}$
	$2\frac{6}{8}$	$\frac{4}{5}$	$1\frac{4}{6}$	$4\frac{5}{9}$	$2\frac{2}{3}$	$5\frac{3}{4}$	$5\frac{6}{12}$

Workmen's Wages

1. The figures at the left show the wages earned per hour by different kinds of workmen. If the bricklayer works 35 hours a week, what will be his week's wages?

2. The plumber works $4\frac{1}{2}$ hr. on one job, $5\frac{3}{4}$ hr. on a second job, and $1\frac{3}{4}$ hr. on a third job. How much does he earn in all?

3. How much does the carpenter earn in 30 min.?

4. If the bricklayer worked from 8 o'clock in the morning until 12 noon, how much would he earn?

5. The stone mason worked from 8 in the morning until noon. In the afternoon he worked from 3 to 4:30. What did he earn that day?

6. The carpenter worked $6\frac{2}{3}$ hr. How much did he earn?

7. The stone mason and the bricklayer both worked for 15 hours. How much more did the bricklayer make?

8. If the carpenter gets "time and a half" for overtime, what does he earn working overtime for 1 hr.? 7 hr.?

9. How much will the mason earn if he gets "time and a half" for 27 hr.?

Subtracting Unlike Fractions

What are like fractions? What are unlike fractions? (Page 229)

Something Old

You know how to add unlike fractions. Before adding you change the fractions so they have like denominators.

$$\frac{1}{2} = \frac{2}{4}$$
$$\frac{1}{4} \quad \frac{1}{4}$$
$$\frac{3}{4}$$

Something New

To subtract unlike fractions, you must change them so they will have like denominators. Then subtract their numerators.

$$\frac{1}{2} = \frac{2}{4}$$
$$\frac{1}{4} \quad \frac{1}{4}$$
$$\frac{1}{4}$$

First we will try the old. Copy and add:

1.

$\frac{1}{4}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{5}{8}$	$\frac{1}{2}$	$\frac{7}{8}$	$\frac{5}{6}$	$\frac{1}{6}$	$\frac{7}{8}$
$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{12}$	$\frac{1}{2}$

2.

$\frac{5}{12}$	$\frac{2}{3}$	$\frac{5}{6}$	$\frac{1}{3}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{2}{3}$	$\frac{5}{6}$
$\frac{1}{3}$	$\frac{1}{6}$	$\frac{2}{3}$	$\frac{1}{6}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{5}{12}$	$\frac{2}{9}$

3. Now we will try the new. Copy examples 1 and 2 above, and subtract.

Before adding or subtracting unlike fractions, you must change them into like fractions.

Copy and subtract. Leave answers in best form.

4.

$\frac{3}{4}$	$\frac{7}{8}$	$\frac{5}{6}$	$\frac{7}{9}$	$\frac{1}{3}$	$\frac{5}{12}$	$\frac{2}{3}$	$\frac{2}{3}$	$\frac{2}{3}$
$\frac{3}{8}$	$\frac{3}{4}$	$\frac{2}{3}$	$\frac{2}{3}$	$\frac{1}{9}$	$\frac{1}{6}$	$\frac{7}{12}$	$\frac{4}{9}$	$\frac{1}{2}$

Subtracting Mixed Numbers

When the fraction in the minuend is smaller than the fraction in the subtrahend, you must borrow as you did on page 256.

$7\frac{1}{4}$ minuend
$3\frac{3}{4}$ subtrahend
$3\frac{2}{4} = 3\frac{1}{2}$

In some subtractions, you must borrow and you must change unlike fractions to like fractions, too.

1. Mr. White is a carpenter. He needs a piece of board $3\frac{7}{8}$ inches wide. The only board he has is $8\frac{1}{2}$ inches wide. If he saws the narrower board from the wider board, how much of the wider board will be left?

Change unlike fractions to like fractions as in A.

Since you cannot take $\frac{7}{8}$ from $\frac{4}{8}$, you borrow 1 whole from 8 and cut the 1 whole into $\frac{8}{8}$. Rewrite $8\frac{4}{8}$ as $7\frac{12}{8}$.

A		B
$8\frac{1}{2} = 8\frac{4}{8}$		$= 7\frac{12}{8}$
$3\frac{7}{8}$	$3\frac{7}{8}$	$3\frac{7}{8}$
		$4\frac{5}{8}$

Subtract $3\frac{7}{8}$ from $7\frac{12}{8}$. The remainder is $4\frac{5}{8}$.

Copy and subtract:

2.

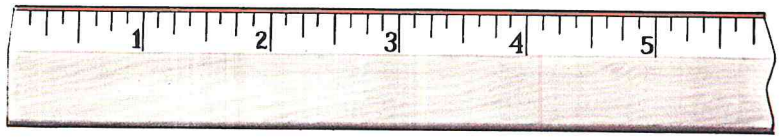
$8\frac{1}{3}$	$5\frac{3}{8}$	$9\frac{2}{9}$	$7\frac{1}{6}$	$12\frac{1}{4}$	$15\frac{2}{3}$
$4\frac{2}{3}$	$2\frac{7}{8}$	$4\frac{2}{3}$	$5\frac{1}{3}$	$7\frac{1}{2}$	$11\frac{5}{6}$

3.

$9\frac{1}{8}$	$4\frac{1}{3}$	$7\frac{3}{4}$	$6\frac{1}{2}$	$67\frac{1}{8}$	$35\frac{5}{8}$
$5\frac{1}{4}$	$2\frac{5}{6}$	$5\frac{7}{8}$	$2\frac{7}{8}$	$24\frac{1}{2}$	$12\frac{3}{4}$

4.

$5\frac{1}{4}$	$14\frac{1}{8}$	$12\frac{1}{4}$	$19\frac{1}{3}$	$17\frac{1}{8}$	$37\frac{1}{6}$
$2\frac{3}{4}$	$7\frac{3}{8}$	$6\frac{1}{2}$	$14\frac{5}{6}$	$12\frac{1}{2}$	$14\frac{1}{3}$



Do You Know How to Use Your Foot Ruler?

1. Point off these lengths on your foot ruler: 1 inch; 2 inches; 6 inches; $\frac{1}{2}$ inch; $1\frac{1}{2}$ inches; $\frac{1}{4}$ inch; $2\frac{7}{8}$ inches.

2. Write the letters a, b, c, d, and e on paper. After each letter, write "Yes" or "No" according as the statement with that letter is right or wrong. Look at your ruler if you need to.

a. $\frac{2}{8}$ in. is the same as $\frac{1}{4}$ in.
b. $\frac{1}{2}$ in. is less than $\frac{5}{8}$ in.
c. $\frac{3}{8}$ in. is more than $\frac{1}{2}$ in.
d. $\frac{6}{8}$ in. is the same as $\frac{3}{4}$ in.
e. $\frac{3}{4}$ in. is $\frac{2}{8}$ in. more than $\frac{1}{2}$ in.

Do You Know Your Tables of Measures?

3. Write the letters a, b, c, d, e, f, g, and h on paper. After each letter, write "Yes" or "No."

a. 4 mo. is the same as $\frac{1}{3}$ yr.
b. If I save \$1 a week, I can save \$52 in 1 yr.
c. A 6-inch line is $\frac{1}{2}$ ft. long.
d. $2\frac{1}{2}$ doz. eggs are the same as 24 eggs.
e. There are 14 days in two weeks.
f. A gallon of milk is the same as 8 quarts.
g. If I pour 4 pints of water in a $\frac{1}{2}$-gallon jar, the jar will be full.
h. 4 oz. is the same as $\frac{1}{4}$ lb.

Giant Trees of California

Riding Through a Redwood Tree

1. On a visit to California Tom learned that the famous redwood trees often measure as much as 30 ft. through the trunk. How many inches is this? How many yards?

2. Measure the length and width of your classroom. Would one of these giants fit in your room?

3. One of the finest of these trees is called the General Grant. It is 264 feet in height. Tom said, "Twenty trees like that would make a mile." Was he right?

4. Tom was told that the tree called the General Sherman is perhaps 5000 years old. Tom is 10 years old. It is how many times as old as he?

5. Find out how the age of a tree is determined.

6. A great tree called the Father of the Forest was said to be 450 ft. tall when it was standing. This tree was how many times as tall as a 25-ft. tree growing in your schoolyard?

7. It is said that the lumber from one of the largest trees would build four hundred five-room houses. How many rooms would this be?

8. Copy and subtract:

$2\frac{3}{8}$	$3\frac{3}{4}$	$1\frac{7}{8}$	$3\frac{2}{3}$	$24\frac{5}{6}$	$45\frac{7}{9}$
$1\frac{1}{4}$	$2\frac{1}{2}$	$\frac{1}{2}$	$1\frac{1}{6}$	$12\frac{1}{2}$	$33\frac{1}{3}$

Using Fractions to Compare

1. There are 12 eggs in the box. Six of the eggs are brown. What part of the eggs are brown?

$$\frac{6 \text{ eggs (numerator)}}{12 \text{ eggs (denominator)}} = \frac{6}{12} = \frac{1}{2}$$

The 6 brown eggs are one-half the dozen eggs.

2. What part of a dozen eggs are 4 eggs? 3 eggs? 8 eggs? 9 eggs? 2 eggs?

3. Mr. White sawed 3 inches from a board 1 foot long. What part of the board did he saw off?

$$\frac{3 \text{ inches (numerator)}}{12 \text{ inches (denominator)}} = \frac{3}{12} = \frac{1}{4}$$

The part sawed off is one-fourth of the whole board.

4. What part of a foot is 4 in.? 6 in.? 9 in.? 2 in.? 8 in.? 10 in.?

5. Mrs. Ray bought a 1-pound steak. Two ounces of the steak were waste. What part of the steak was waste?

$$\frac{2 \text{ ounces (numerator)}}{16 \text{ ounces (denominator)}} = \frac{2}{16} = \frac{1}{8}$$

One-eighth of the steak was waste.

6. What part of a pound is 8 oz.? 12 oz.? 6 oz.? 4 oz.? 10 oz.? 12 oz.?

When you compare, the names of the parts in the numerator must be the same as the names of the parts in the denominator.

When you compare 3 inches with 1 foot, you have to change the 1 foot to inches. When you compare 2 ounces with 1 pound, you have to change the 1 pound to ounces.

7. Gladys snipped 6 inches from a piece of ribbon a yard long. What part of the ribbon did Gladys snip off? What is the name of the numerator? What will the name of the denominator have to be? How many inches are in 1 yard?

8. What part of a yard is 9 in.? 4 in.? 12 in.? 18 in.? 24 in.? 30 in.?

9. What part of a day is 2 hours?

What is the name of the numerator of the fraction you will use? What must the name of the denominator be? How many hours are in a day?

10. What part of a day is 6 hr.? 3 hr.? 8 hr.? 12 hr.? 9 hr.? 16 hr.?

11. Father works 8 hours a day, and it takes him 3 hours a day to go to and from work. What part of a day does he work? What part of a day does it take him to go to and from work?

12. Joan sleeps 10 hours a day. What part of the day does she sleep?

13. Mary practiced 20 minutes. What part of an hour was this?

What is the name of the numerator of the fraction you will use? What must the name of the denominator be? How many minutes are in 1 hour?

14. Joe studied his spelling 15 minutes. What part of an hour was this?

A Quick Way to Reduce Fractions

Study page 209 again.

1. Ann has a ribbon 9 inches long. What part of a yard is 9 inches?

The fraction $\frac{9}{36}$ must be reduced to lowest terms.

Old Way

$$\frac{9 \div 9}{36 \div 9} = \frac{1}{4}$$

New Way

$$\frac{\overset{1}{\cancel{9}}}{\underset{4}{\cancel{36}}} = \frac{1}{4}$$

In the new way, you cross out (cancel) the numerator 9 and write in its place the number you get when you divide 9 by 9. You also cross out (cancel) the denominator 36 and write in its place the number you get when you divide 36 by 9. The new numerator is 1; the new denominator is 4.

Study the examples below.

2. $\frac{\overset{3}{\cancel{6}}}{\underset{4}{\cancel{8}}} = \frac{3}{4}$ **3.** $\frac{\overset{5}{\cancel{10}}}{\underset{6}{\cancel{12}}} = \frac{5}{6}$ **4.** $\frac{\overset{3}{\cancel{27}}}{\underset{4}{\cancel{36}}} = \frac{3}{4}$

To reduce a fraction to lowest terms by cancellation, think what is the largest number that can be divided evenly in both numerator and denominator. Then divide this number into both numerator and denominator, and cancel.

Copy. Use cancellation to reduce.

5. $\frac{4}{8}$ $\frac{4}{6}$ $\frac{2}{8}$ $\frac{3}{9}$ $\frac{6}{9}$ $\frac{6}{15}$ $\frac{4}{24}$ $\frac{3}{24}$

6. $\frac{8}{12}$ $\frac{10}{15}$ $\frac{8}{16}$ $\frac{8}{24}$ $\frac{5}{25}$ $\frac{9}{12}$ $\frac{10}{16}$ $\frac{10}{20}$

Helps in Canceling

Each number below is the product of two other numbers. Say the two numbers that go with each product. Say the first one, "6 equals 2 times 3."

1. 6 15 21 10 14 25 4 22 39

Some numbers give more than one answer. For 12, you could say, "12 equals 3 times 4," or you could say, "12 equals 2 times 6." Give more than one answer for each number below.

2. 24 18 32 16 28 20 72 36 40

3. 60 64 30 50 42 45 48 56 54

Say the largest number that is contained exactly in the two numbers:

4. 5 and 10 4 and 16 3 and 12 12 and 24

5. 10 and 15 12 and 16 20 and 25 27 and 36

6. 18 and 32 21 and 35 35 and 49 8 and 60

7. 6 and 30 6 and 36 9 and 27 8 and 24

8. 14 and 18 16 and 24 10 and 36 6 and 24

Copy the fractions. Reduce by cancellation.

9. $\frac{9}{24}$ $\frac{21}{35}$ $\frac{15}{25}$ $\frac{14}{49}$ $\frac{18}{24}$ $\frac{6}{36}$ $\frac{6}{27}$ $\frac{27}{36}$

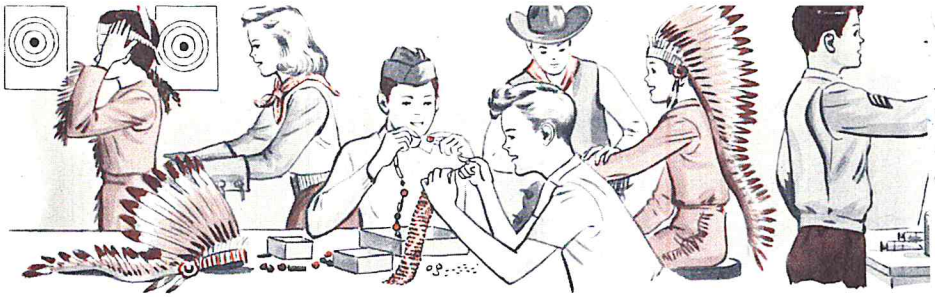
10. $\frac{28}{49}$ $\frac{12}{60}$ $\frac{8}{36}$ $\frac{15}{27}$ $\frac{18}{27}$ $\frac{6}{24}$ $\frac{8}{60}$ $\frac{15}{35}$

11. $\frac{24}{32}$ $\frac{15}{18}$ $\frac{7}{28}$ $\frac{4}{28}$ $\frac{21}{24}$ $\frac{20}{25}$ $\frac{18}{32}$ $\frac{14}{18}$

12. Jim rode $1\frac{1}{4}$ miles and walked $\frac{7}{8}$ mile. How far did he go in all?

13. Harry caught a fish that weighed $2\frac{1}{4}$ pounds and Dick caught one that weighed $1\frac{1}{2}$ pounds. How much heavier was Harry's fish?

14. Tom had a fishing pole 8 feet long. If $1\frac{3}{4}$ feet are broken off, how much is left?



A Cowboy and Indian Show

1. Jim is reading a book called "The Cowboy's Escape." He has read $\frac{2}{3}$ of the book. If there are 204 pages in the whole book, how many pages has he read?

2. Jim decided to give a Cowboy and Indian Show. Jim wants to make a sign 7 feet long. Will a 72-inch window shade be long enough?

3. Dot made head dresses for five Indian players. How many yards of ribbon will she need if the head dresses measure $26\frac{1}{2}$ in., $30\frac{1}{4}$ in., $27\frac{3}{4}$ in., $30\frac{5}{8}$ in., and $28\frac{7}{8}$ in.?

4. Dot dyed some white feathers for the head dresses. She made 24 blue feathers, 63 red feathers, 37 green feathers, and left 21 white. How many will she be able to put on each head dress if she puts the same number on each?

5. Jane has a string of red beads that is $8\frac{3}{4}$ in. long. She also has a string of red beads $5\frac{5}{8}$ in. long. She decides to string all of these beads together. How long will the bead chain be?

6. Jack cut $13\frac{5}{6}$ ft. off a 36-ft. rope, and gave it to Bill. How many feet did Jack have left? Did he have more than 7 yd. of rope left?

First Call to the Rifle Range

Fractions are the targets. Aim to do your best. Stop after each section and mark your paper.

Section I. Subtract:

$\frac{7}{8}$	$\frac{7}{12}$	$\frac{8}{9}$	$\frac{4}{5}$	$\frac{3}{4}$	$\frac{5}{6}$	$\frac{7}{9}$	$\frac{5}{8}$	$\frac{11}{12}$
$\frac{3}{8}$	$\frac{5}{12}$	$\frac{5}{9}$	$\frac{3}{5}$	$\frac{1}{4}$	$\frac{1}{6}$	$\frac{5}{9}$	$\frac{3}{8}$	$\frac{1}{12}$
$\frac{1}{3}$	$\frac{5}{9}$	$\frac{1}{2}$	$\frac{7}{9}$	$\frac{5}{8}$	$\frac{7}{12}$	$\frac{1}{4}$	$\frac{9}{16}$	$\frac{2}{3}$
$\frac{1}{4}$	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{2}{3}$	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{1}{12}$	$\frac{1}{4}$	$\frac{5}{12}$

Section II. Subtract:

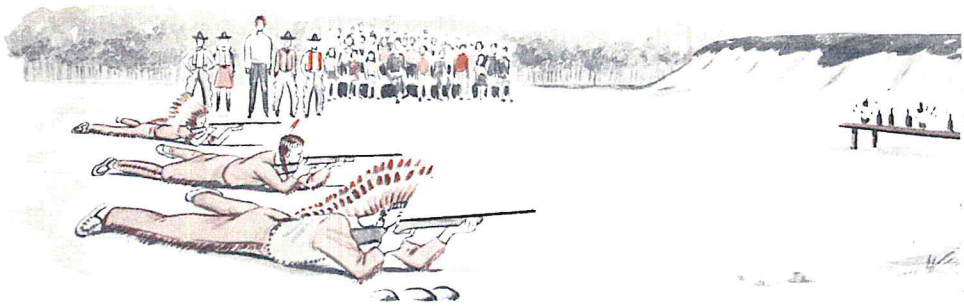
$4\frac{1}{4}$	$5\frac{1}{3}$	$7\frac{1}{2}$	$8\frac{11}{12}$	$12\frac{1}{2}$	$67\frac{3}{4}$	$235\frac{7}{9}$
$3\frac{1}{8}$	$2\frac{1}{6}$	$3\frac{1}{4}$	$5\frac{7}{12}$	$6\frac{1}{3}$	$23\frac{1}{4}$	$132\frac{1}{3}$
$4\frac{1}{8}$	$6\frac{1}{2}$	$8\frac{1}{4}$	$9\frac{1}{12}$	$12\frac{1}{6}$	$45\frac{1}{9}$	$387\frac{3}{8}$
$1\frac{1}{4}$	$3\frac{7}{8}$	$4\frac{1}{2}$	$5\frac{1}{3}$	$3\frac{1}{3}$	$2\frac{1}{3}$	$254\frac{7}{8}$

Section III. Reduce to lowest terms. Use cancellation.

A.	$\frac{10}{12}$	$\frac{14}{24}$	$\frac{20}{25}$	$\frac{9}{27}$	$\frac{8}{12}$	$\frac{9}{12}$	$\frac{12}{36}$	$\frac{9}{36}$
B.	$\frac{4}{6}$	$\frac{24}{32}$	$\frac{18}{24}$	$\frac{25}{45}$	$\frac{14}{49}$	$\frac{4}{12}$	$\frac{21}{28}$	$\frac{16}{24}$

There are 48 targets on this page. If you hit at least 42 bulls-eyes, you are a sharpshooter and may work on page 269.

There is practice on page 268 for the others.



Second Call to the Rifle Range

In what sections on page 267 did you make mistakes? You need more practice with that sort of work. Under each section number below, you will find the numbers of the pages to study.

Sections	I	II	III
Helping pages	248, 249, 258	250, 256, 259	264, 265

1. After you have studied the pages named above that you need to study, do page 267 again.

2. Challenge a neighbor to run these races with you. In each race, you copy the example and subtract. Leave each answer in best form.

Race I

$\frac{3}{4}$	$\frac{5}{6}$	$\frac{7}{8}$	$\frac{4}{9}$	$\frac{3}{4}$	$\frac{5}{6}$	$\frac{7}{8}$	$\frac{2}{3}$
$\frac{1}{4}$	$\frac{3}{6}$	$\frac{3}{8}$	$\frac{1}{9}$	$\frac{1}{2}$	$\frac{2}{3}$	$\frac{1}{4}$	$\frac{1}{6}$

Race II

$4\frac{3}{4}$	$5\frac{5}{6}$	$4\frac{1}{4}$	$8\frac{1}{4}$	$9\frac{1}{3}$	$4\frac{1}{2}$
$2\frac{1}{2}$	$3\frac{1}{3}$	$1\frac{1}{8}$	$2\frac{1}{2}$	$3\frac{5}{6}$	$2\frac{7}{8}$

3. The first number is what part of the second?

9 in., 1 ft.	10 oz., 1 lb.
9 in., 1 yd.	4, 1 doz.

A Page for Sharpshooters

"Goodness, Mrs. Smith, it is 11:15. Have you been waiting long?"

"Yes, Mrs. Brown. I got here at 10:50, but it is all right."

"I am sorry I kept you waiting, but I found a beautiful lamp on sale. The regular price was $15, but it was marked down $\frac{1}{3}$."

"That's wonderful. I hope my shopping goes as well. E-Z Sole shoes are priced for today only at $5.75 a pair. The regular price is $7.50."

"I wish I had waited for the sale. I bought two pairs last week at the regular price."

"Children's dresses that always sell for $2 are only $1.79 today. I will get six for Susan."

"Why don't you get some socks for Susan? The 25-cent kind are on sale at 19¢ a pair."

Problems

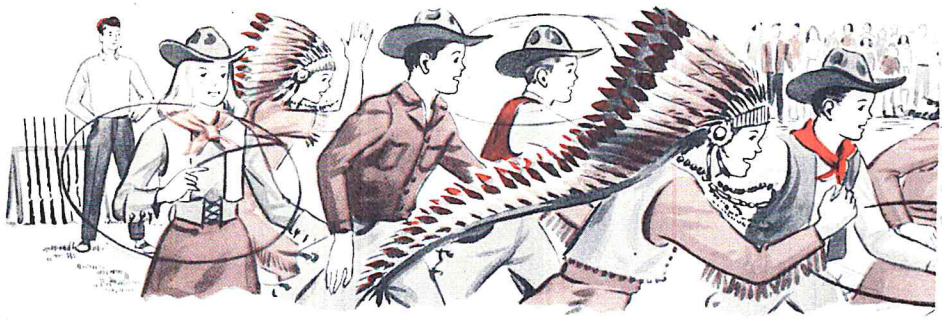
1. How many minutes late was Mrs. Brown?

2. What did Mrs. Brown pay for the lamp?

3. How much could Mrs. Brown have saved if she had waited for the sale to buy her shoes?

4. How much can Mrs. Smith save on six dresses?

5. How much can Mrs. Smith save in buying a half dozen pairs of socks at the sale?



Dress Parade—Review of Unit 10

1. Copy and subtract:

a	b	c	d	e	f	g	h
$\frac{3}{4}$	$\frac{1}{3}$	$\frac{1}{2}$	$2\frac{3}{5}$	12	15	$28\frac{1}{2}$	$42\frac{1}{6}$
$\frac{1}{4}$	$\frac{1}{6}$	$\frac{1}{4}$	$1\frac{2}{5}$	$\frac{3}{4}$	$\frac{1}{2}$	$10\frac{3}{8}$	$4\frac{2}{3}$

2. Reduce to lowest terms. Use cancellation.

$\frac{18}{20}$ $\frac{14}{21}$ $\frac{15}{25}$ $\frac{12}{16}$ $\frac{10}{15}$ $\frac{9}{12}$ $\frac{6}{8}$ $\frac{8}{12}$ $\frac{8}{16}$

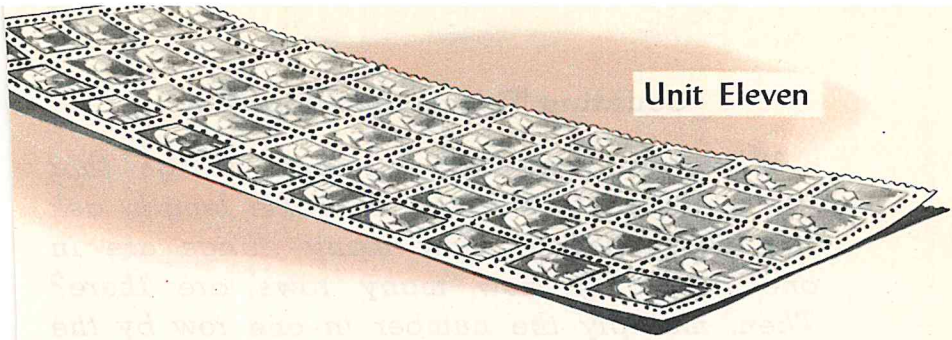
3. Jack weighs $13\frac{1}{8}$ pounds more than Peggy. What does Peggy weigh if Jack weighs $59\frac{1}{4}$ lb.?

4. Donald and Jane both stood on the scales. Together they weighed 180 pounds. If Donald weighs $98\frac{1}{2}$ pounds, how much does Jane weigh?

5. Tom and Alice stood on the scales together. They weighed $175\frac{1}{2}$ pounds. Tom stepped off, and the scales showed that Alice weighed $79\frac{3}{4}$ pounds. How much does Tom weigh?

6. It is $3\frac{1}{2}$ miles from Tom's house to the swimming pool. He rode $1\frac{7}{8}$ miles to Donald's house on his bicycle, and they walked the rest of the way to the swimming pool. How far did they walk?

7. Sam wants to mail three books. One book weighs $\frac{5}{8}$ lb., another $1\frac{1}{4}$ lb., and the third $\frac{3}{4}$ lb. How much will the package weigh?



A Faster Way to Count

Billy had given the post office clerk a half dollar and had asked for fifty 1-cent stamps. The clerk gave him the stamps fastened together in a sheet. Billy started to count them one at a time.

The clerk said to him, "That way is too slow. Besides you may miss some or count some twice. This is a better way."

The clerk then told Billy to count all the stamps in one row. There were 10 stamps in a row. Then he should count the number of rows. There were 5 rows. Then he should multiply the number of stamps in one row by the number of rows.

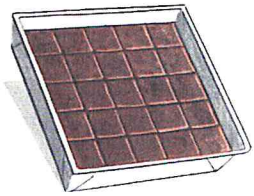
5 times 10 stamps equals 50 stamps.

1. Harold is saving his money and buying savings stamps at the post office. On each page of his savings book he pastes two rows of stamps with four stamps in each row. Draw a picture of a page. Tell how many stamps are on a page without counting them.

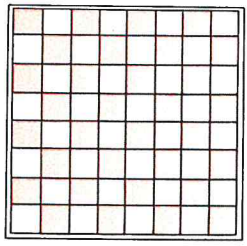
Counting Things the Short Way

Whenever you want to count things that are arranged in rows of the same length, ask two questions: (1) *How many things are in one row?* (2) *How many rows are there? Then, multiply the number in one row by the number of things you wanted to count.*

1. John bought a box of chocolates. Without counting them all, he said there were 24 chocolates in the box. Was he right? How do you find the number quickly?



2. Joan made a pan of fudge and cut it into squares. How many pieces in a row? How many rows? How many pieces of fudge in all?



3. If Joan had cut her pan of fudge into 8 rows with 6 pieces in a row, how many pieces would she have had?

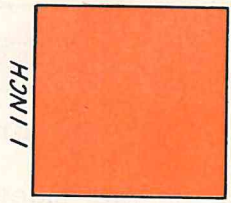
4. Morris made a checkerboard. How many squares are in one row? How many rows? How many squares in all?

5. Ted planted 17 peach trees in a row. If he planted 15 rows, how many trees did he plant?

The Areas of Squares and Rectangles

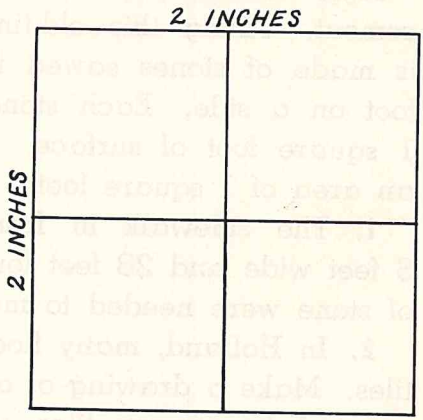
What is a square? What is a rectangle? How are they alike and how are they different?

The square in the picture is 1 inch on a side. Its area is 1 square inch.



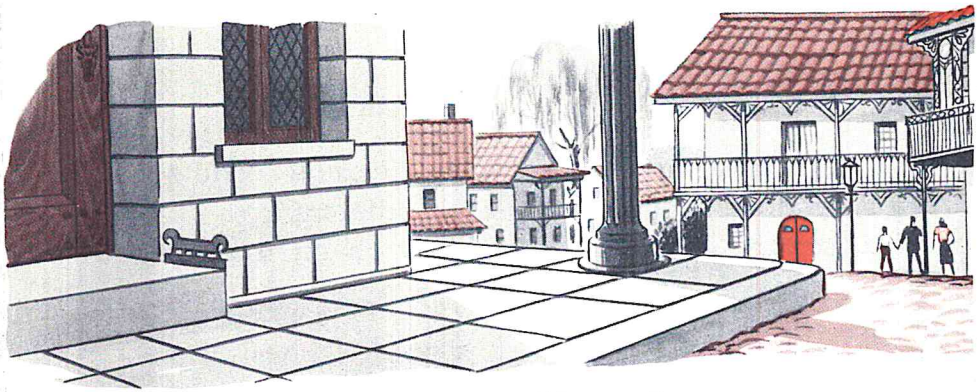
1. Draw a square 1 inch on a side and color it red. You have colored 1 **square inch** of surface or area.

2. Draw a square 2 inches on a side. Divide it into squares each 1 inch on a side. How many of the smaller squares are there? What is the area of each smaller square? The area of the square 2 inches on a side is 4 square inches.



3. Color green the surface or area of the square you drew in 2 above. How many rows of smaller squares did you color? How many were in 1 row? How many did you color altogether?

4. Draw a rectangle 2 inches wide and 3 inches long. Divide it into squares each 1 inch on a side. How many squares in 1 row? How many rows are there? How many squares in all?



Learning About Areas

Most of the sidewalks we see are made of cement. Along this old-time street the sidewalk is made of stones sawed in squares exactly one foot on a side. Each stone, then, covers exactly 1 square foot of surface. We say the stone has an area of 1 square foot.

1. The sidewalk in front of Marie's home is 5 feet wide and 28 feet long. How many squares of stone were needed to make this sidewalk?

2. In Holland, many floors are made of square tiles. Make a drawing of a floor 8 feet by 10 feet, covered by square tiles each 1 foot on a side. Allow 1 inch to stand for 1 foot of the floor. How many tiles are needed to cover this floor? What is the area of this floor in square feet?

3. The floor of a game room is covered with tiles each 1 foot on a side. The room is 28 feet by 32 feet. How many tiles are needed to cover the floor? What is the area?

4. The ceiling of the new movie theater is a rectangle, covered with fiber squares each 1 foot

on a side. Robert counted 40 squares across and 75 squares lengthwise the theater. How many squares were there in all? What was the area of the ceiling in square feet?

5. What is the length in feet of the theater described in problem 4? What is the width in feet?

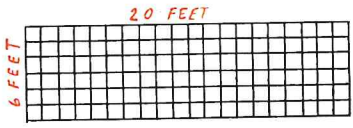
6. Joan is preparing to serve a lunch on an old table in the back yard. She plans to cover the top of the table with paper napkins. If the top is 3 feet by 8 feet and the napkins are squares 1 foot on a side, how many napkins will she need? What is the area in square feet of the table top?

7. Mrs. May has a piece of white goods 3 feet wide and 12 feet long. She will tear the goods into squares 1 foot on a side to make handkerchiefs. How many handkerchiefs can she get from the piece of goods? What is the area in square feet of the goods?

8. Grandmother is making a quilt 5 feet by 8 feet from squares that are 1 foot on a side. How many squares will Grandmother need? What will be the area in square feet of the quilt when it is finished?

9. Choose someone to draw on the blackboard a square one foot on a side. Divide this into 1-inch squares. What is the area of the large square? What is the area of each of the smaller squares? How many square inches in one row? How many rows of small squares are there? How many square inches in the square foot?

Finding the Areas of Larger Rectangles



To find the area of any rectangle, you multiply the number of squares in one row by the number of rows. This is exactly what you did when you counted stamps the quick way (page 271) or counted pieces of candy (page 272) or found the area of small rectangles (page 273). You found the answer by multiplying the number in a row by the number of rows.

1. Tim is going to put sod on his yard. The yard is 20 feet long and 6 feet wide. He wants to know how many square feet of sod he will need.

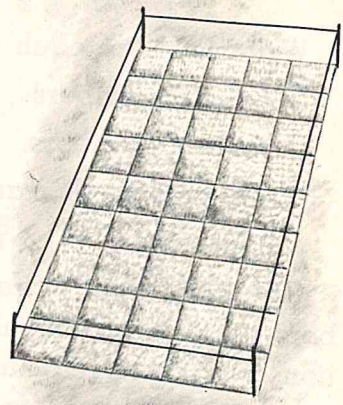
Look at the picture above and answer these questions. What is the area of 1 square in Tim's yard? How many squares are in a row? How many rows are there? How many squares are there in all? What is the area of Tim's yard?

2. The living room in Tim's home is 8 yards long and 5 yards wide. Draw a picture of this living room. Make the picture 8 inches long and 5 inches wide. Divide the picture into squares to help in finding the area. How many squares are in a row? How many rows? How many squares in all? What is the area of the room?

3. The kitchen in Tim's home is 4 yards long and 3 yards wide. Draw a picture to scale, and find the area of the kitchen.

Finding Areas and Perimeters of Rectangles

The perimeter of a rectangle is the distance around it, as the total length of string around the newly sodded yard. *The area of a rectangle is the total surface covered.*



Would you use area or perimeter if you were—

a. Building a fence around a field?

b. Plowing a field?

c. Painting the floor?

d. Finding the length of strip needed to make a picture frame?

1. Father will paint the floor of the porch. The porch is 25 feet long and 12 feet wide. How many square feet will he need to paint?

2. Tom's vegetable garden is 25 feet long and 12 feet wide. How many feet of wire will it take to go around it?

3. What is the area of Tom's garden?

4. Tom wants to put ground limestone on his garden at the rate of 10 pounds for each 100 square feet of area. How many pounds of ground limestone will he need?

A Quick Review of Fractions

1. Say which of the following are proper fractions and which are improper fractions:

$\frac{3}{4}$ $\frac{6}{2}$ $\frac{4}{3}$ $\frac{1}{2}$ $\frac{5}{6}$ $\frac{8}{9}$ $\frac{9}{3}$ $\frac{1}{8}$ $\frac{5}{12}$ $\frac{7}{7}$

Write three of each of the following:

2. whole numbers

3. mixed numbers

4. proper fractions

5. improper fractions

6. Reduce each fraction to lowest terms:

$\frac{6}{8}$ $\frac{8}{16}$ $\frac{12}{20}$ $\frac{9}{12}$ $\frac{6}{9}$ $\frac{4}{18}$ $\frac{3}{6}$ $\frac{10}{24}$ $\frac{4}{6}$

Change these improper fractions to whole numbers or to mixed numbers. Be sure that the fraction of each mixed number is in lowest terms.

7. $\frac{12}{8}$ $\frac{8}{3}$ $\frac{6}{6}$ $\frac{9}{4}$ $\frac{11}{6}$ $\frac{10}{3}$ $\frac{15}{4}$ $\frac{16}{2}$ $\frac{10}{6}$

8. $\frac{14}{9}$ $\frac{3}{2}$ $\frac{5}{3}$ $\frac{9}{6}$ $\frac{10}{4}$ $\frac{7}{3}$ $\frac{16}{4}$ $\frac{20}{5}$ $\frac{12}{9}$

Explain each of these at the blackboard. If you are not sure of any one, study again the page whose number is given in the parenthesis.

9. Finding a common denominator of two unlike fractions; of three unlike fractions. (229, 230)

10. Reducing a fraction to lowest terms with cancellation. (210)

11. Changing an improper fraction into a mixed number. (212)

12. Changing a fraction to higher terms. (228)

13. Finding the least common denominator of $\frac{1}{2}$, $\frac{1}{6}$ and $\frac{1}{4}$. (236)

Adding and Subtracting Fractions: A Review

Add. Leave each answer in best form.

1. $\frac{5}{6}$ $\frac{3}{4}$ $\frac{5}{8}$ $\frac{13}{16}$ $\frac{5}{3}$ $\frac{9}{12}$ $\frac{8}{6}$ $\frac{8}{5}$ $\frac{18}{7}$
   $\frac{3}{6}$ $\frac{2}{4}$ $\frac{3}{8}$ $\frac{9}{16}$ $\frac{1}{3}$ $\frac{3}{12}$ $\frac{2}{6}$ $\frac{2}{5}$ $\frac{4}{7}$

2. Subtract the fractions in 1 above.

3. Which groups contain unlike fractions?

   $\frac{1}{8}, \frac{7}{8}, \frac{5}{8}$ $\frac{2}{3}, \frac{5}{6}, \frac{5}{12}$ $\frac{1}{2}, \frac{1}{5}, \frac{7}{10}$ $\frac{1}{4}, \frac{1}{8}, \frac{1}{2}$

Find the least common denominator of each group of fractions:

4. $\frac{2}{3}, \frac{5}{6}$ $\frac{1}{4}, \frac{3}{8}$ $\frac{3}{4}, \frac{5}{6}, \frac{7}{12}$ $\frac{3}{5}, \frac{1}{2}, \frac{5}{10}$

5. $\frac{1}{4}, \frac{1}{6}$ $\frac{2}{3}, \frac{1}{5}$ $\frac{1}{4}, \frac{1}{3}, \frac{1}{2}$ $\frac{1}{2}, \frac{1}{5}, \frac{1}{4}$

Add. Leave each answer in best form.

6. $\frac{2}{3}$ $\frac{3}{4}$ $\frac{3}{5}$ $\frac{5}{6}$ $\frac{1}{2}$ $\frac{1}{3}$ $\frac{1}{2}$ $\frac{2}{5}$ $\frac{1}{8}$
   $\frac{1}{2}$ $\frac{5}{8}$ $\frac{3}{10}$ $\frac{7}{12}$ $\frac{3}{5}$ $\frac{3}{4}$ $\frac{1}{3}$ $\frac{1}{6}$ $\frac{5}{12}$
   $\frac{1}{6}$ $\frac{1}{2}$ $\frac{7}{20}$ $\frac{1}{2}$ $\frac{7}{10}$ $\frac{5}{12}$ $\frac{3}{4}$ $\frac{3}{4}$ $\frac{2}{3}$

7. $4\frac{1}{2}$ $6\frac{2}{3}$ $11\frac{5}{8}$ $5\frac{4}{5}$ $12\frac{3}{4}$ $26\frac{5}{6}$
   $5\frac{3}{8}$ $2\frac{1}{6}$ $25\frac{1}{4}$ $3\frac{7}{10}$ $9\frac{1}{2}$ $17\frac{2}{3}$

8. $4\frac{5}{8}$ $8\frac{3}{5}$ $7\frac{3}{10}$ $8\frac{1}{3}$ $6\frac{7}{12}$ $9\frac{1}{4}$
   $2\frac{7}{8}$ $1\frac{7}{10}$ $4\frac{4}{5}$ $8\frac{3}{4}$ $2\frac{2}{3}$ $4\frac{7}{8}$

Subtract. Leave each answer in best form.

9. $\frac{7}{8}$ $\frac{9}{16}$ $\frac{3}{4}$ $\frac{2}{3}$ $\frac{7}{10}$ $\frac{8}{9}$ $\frac{1}{2}$ $\frac{15}{16}$ $\frac{10}{12}$
   $\frac{1}{4}$ $\frac{1}{8}$ $\frac{5}{16}$ $\frac{1}{6}$ $\frac{2}{5}$ $\frac{2}{3}$ $\frac{1}{3}$ $\frac{3}{8}$ $\frac{1}{3}$

10. $7\frac{4}{5}$ $8\frac{3}{4}$ $9\frac{1}{4}$ $5\frac{2}{3}$ $7\frac{1}{6}$ $8\frac{1}{4}$
    $3\frac{2}{6}$ $3\frac{1}{4}$ $4\frac{1}{8}$ $2\frac{1}{6}$ $4\frac{1}{3}$ $4\frac{5}{12}$

Boys and Girls at Work

1. Mary washes windows for Mrs. Jones. Mary gets 8¢ for each window. What will she earn if she washes 25 windows?

2. It takes Mary 12 min. to wash a window. How many hours will she take to wash the 25 windows?

3. If Mary washes the windows for Mrs. Jones twice each month, what will she earn in a year?

4. Joan walks the dog for Mrs. Smith 6 days each week. If she walks 20 min. each time, how many hours does she walk in a week?

5. Mrs. Smith pays Joan 10¢ each day. How much does she earn in a week? In a year?

6. Joan decided to save 15¢ each week. How much did she save in a year?

7. Bill works in the grocery store. He gets $.30 an hour. How much did he earn last week if he worked $3\frac{1}{2}$ hr. Monday, $2\frac{3}{4}$ hr. Wednesday, and $6\frac{3}{4}$ hr. Saturday?

8. Bill sold Mrs. Brown 9 oranges. What part of a dozen was this?

9. A piece of bacon she bought weighed 12 oz. What part of a pound was this?

10. Mrs. Brown bought ten lemons selling at 2 for 5¢. What did Bill charge her for the lemons?

11. Bill had 3 pounds of tub butter on the scale. He took off $1\frac{1}{2}$ lb. What was the weight of the butter left on the scale?

12. Mrs. Smith bought $3\frac{3}{4}$ lb. of lard, $2\frac{1}{8}$ lb. of cheese, $5\frac{1}{2}$ lb. of potatoes, and a loaf of bread that weighed 10 oz. Bill put all in a big sack. How many pounds did Mrs. Smith have in the bag?

13. Alice helped Mrs. Hunt with her flower garden. Alice planted $\frac{3}{4}$ dozen bulbs in one row, $\frac{1}{2}$ dozen in another row, and $1\frac{5}{6}$ dozen in a third row. How many dozens did she plant in all?

14. Jack spaded a garden for Mrs. Hunt. The garden was 20 ft. wide and 45 ft. long. How many square feet of earth did he spade?

15. Mrs. Hunt sent Jack to the store to buy fence wire for the 20′ x 45′ garden. How many feet of wire should he buy?

16. The dealer told Jack he had a roll of wire containing 8 rods of fine wire which he would sell him at a bargain price. Would this be enough?

Writing Fractions a New Way

1. The baker made a large pan of ginger cake and cut it into ten equal pieces. Henry bought one of the pieces. What part of the ginger cake did Henry buy?

The answer is one-tenth.

One-tenth can be written in figures in two ways:

The Old Way	The New Way
$\frac{1}{10}$	.1

You read $\frac{1}{10}$ as one-tenth, and you read .1 as one-tenth.

When you write $\frac{1}{10}$ you are writing a common fraction. When you write .1, you are writing a decimal fraction.

2. Sam bought two pieces of the ginger cake. What part of it did he buy? The answer is two-tenths. You can write the answer in figures as $\frac{2}{10}$ or as .2.

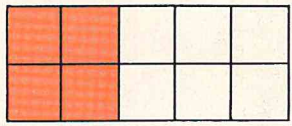
3. Write as decimal fractions:

$\frac{1}{10}$ $\frac{2}{10}$ $\frac{3}{10}$ $\frac{4}{10}$ $\frac{5}{10}$ $\frac{6}{10}$ $\frac{7}{10}$ $\frac{8}{10}$ $\frac{9}{10}$

4. Write as common fractions:

.3 .7 .9 .4 .6 .8 .5 .2 .1

The Meaning of Tenths



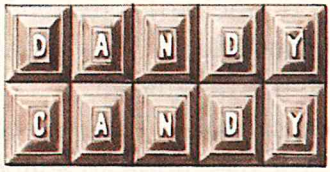
The rectangle is divided into 10 equal squares. Each square is $\frac{1}{10}$ or .1 of the rectangle. Four of the squares are shaded. What part of the rectangle is shaded? What part of the rectangle is white?

1. Draw eight rectangles and divide each into 10 equal parts. Color parts to show:

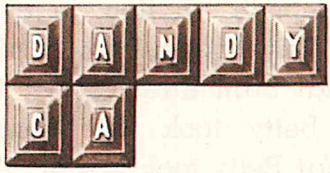
.5 .3 .7 .9 .2 .8 .6 .4

Usually we shorten the name of decimal fractions and call them just decimals.

John's Candy Bar



Mary's Candy Bar



2. John has 1 candy bar and Mary has $\frac{7}{10}$ candy bar left. Together they have $1\frac{7}{10}$ candy bar. This can be written as a mixed decimal 1.7.

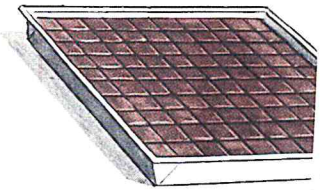
A **mixed decimal** *is a number made up of a whole number and a decimal fraction. The decimal point is always read as "and."*

3. Read these mixed decimals:

6.5 9.1 11.7 28.4 5.8 7.6 214.9 5.0

4. Write these mixed numbers as mixed decimals:

$8\frac{6}{10}$ $1\frac{4}{10}$ $3\frac{7}{10}$ $16\frac{1}{10}$ $7\frac{3}{10}$ $12\frac{5}{10}$ $153\frac{2}{10}$



The Meaning of Hundredths

Betty made fudge and poured it into a large square pan. She cut it into 10 rows with 10 pieces in a row. How many pieces were there?

Betty gave 1 piece of the fudge to Harry. This means that Harry had $\frac{1}{100}$ or .01 of all the fudge.

You can write one one-hundredth as $\frac{1}{100}$, a common fraction, or as **.01**, a decimal fraction.

Betty gave Sam 8 pieces of fudge. This means that Sam had $\frac{8}{100}$ or .08 of all the fudge.

Betty took 25 pieces to school. This means that Betty took $\frac{25}{100}$ or .25 of all the fudge to school.

1. Write these fractions as decimals.

$\frac{3}{100}$ $\frac{7}{100}$ $\frac{18}{100}$ $\frac{20}{100}$ $\frac{32}{100}$ $\frac{68}{100}$

The first place to the right of the decimal point is **tenths.**

The second place to the right of the decimal point is **hundredths;** .25 means 2 tenths and 5 hundredths. You read .25 as 25 hundredths.

2. Read these decimal fractions:

.34 .95 .06 .17 .50 .03 .56 .19

3. Read these mixed decimals:

5.02 6.27 9.35 14.23 125.07 526.34

Thinking of Tenths and Hundredths

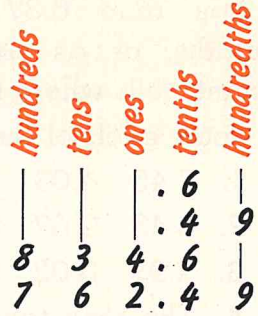
A decimal fraction is named for the place of its right-hand figure.

You read .6 as six tenths.

You read .49 as forty-nine hundredths.

You read 834.6 as eight hundred thirty-four and six tenths.

You read 762.49 as seven hundred sixty-two and forty-nine hundredths.



1. Read each of these decimals:

.4 .63 .9 .76 .5 .05 .50 .87 .80 .07

2. Read each of these mixed decimals:

1.3 7.34 9.2 .76 17.52 2.60 61.05

In a mixed decimal, the decimal point shows where the whole number ends and the decimal fraction begins.

Decimals are often found in one's reading and work. Read each decimal below:

4. The normal body temperature is 98.6°.

5. When Alice had scarlet fever her temperature went to 104.2°.

6. It is 68.3 miles to Boston.

7. The rainfall yesterday was 2.3 inches.

8. The rainfall all last year was 42.6 inches.

9. The river has fallen 1.2 feet.

Reading and Writing Mixed Decimals

You read 6.37 as six **and** thirty-seven hundredths, or as six **point** thirty-seven. The word "point" tells where the decimal point is to be written.

Read each of these mixed decimals in two ways.

1. 7.45 4.03 7.6 9.88 12.00 15.1 189.09

2. 8.43 9.67 8.3 89.1 76.91 31.2 760.00

3. 2.97 8.02 9.9 91.8 38.90 90.1 461.38

4. The time taken to run a race must be measured very accurately. Bob ran 50 yards in 6.9 seconds. Read the number of seconds taken for each of the other boys to run 50 yards.

Jack	Tom	John	Bill	Don	Dick	Elmer
7.1	7.9	8.0	7.5	7.9	8.3	9.6

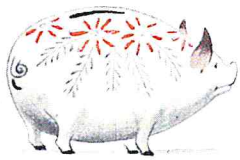
Who came in first in the race? Who came in second? Who came in third? Who came in last?

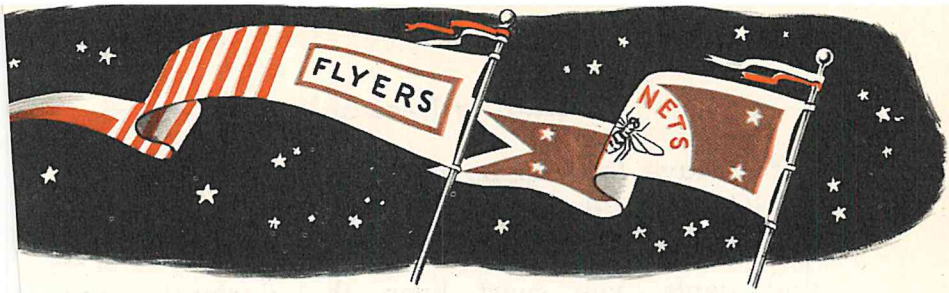
A cent is a hundredth of a dollar. You read \$.12 as twelve cents, and think of it as twelve hundredths of a dollar.

5. Read each of the following:

\$.16 \$.39 \$.81 \$.42 \$.73 \$.10

Dollars and cents are mixed decimals. You read \$6.15 as six dollars and fifteen cents, and think of it as six and fifteen hundredths dollars.





Pennant Races with Mixed Practice

Choose your teams. After each race have someone work the examples correctly on the blackboard. The winning team is the one having the larger number of perfect papers.

Race I. Copy and add:

1. 57, 8, 193, 404
2. 19, 84, 79, 768
3. \$4.28, \$3.60, \$.93
4. \$19.81, \$1.43, \$28.06

Race II. Copy and subtract:

1. 785 from 1,692
2. 304 from 2,001
3. \$10.19 from \$14.05
4. \$145.10 from \$500.

Race III. Multiply:

6	59	48	839	560	109	794
9	7	83	53	37	25	465

Race IV. Multiply:

45	72	56	548	160	648
$7\frac{3}{5}$	$8\frac{5}{6}$	$6\frac{3}{8}$	$5\frac{3}{4}$	$9\frac{7}{8}$	$7\frac{1}{2}$

Race V. Divide:

1. $4\overline{)480}$ $9\overline{)855}$ $32\overline{)1,088}$ $6\overline{)\$42.12}$
2. $68\overline{)6,936}$ $28\overline{)5,684}$ $42\overline{)31,920}$ $256\overline{)5,376}$

Adding Decimals

You have learned how to think of cents as hundredths of a dollar and to think of dollars and cents as mixed decimals. When you add dollars and cents, you must keep the decimal points directly under each other.

Other decimals and mixed decimals are added just as dollars and cents are added. Be sure that the decimal points are under each other.

Mr. Smith kept a record of his business trips. He went 392.16 miles, 398.75 miles, and 412.85 miles. How did he find the sum?

If you were adding dollars and cents, your work would look like this.

$392.16
398.75
412.85
$1,203.76

You are adding miles and parts of miles. Your work looks like this.

392.16 miles
398.75
412.85
1,203.76 miles

1. Study the additions. Cover the sums and add.

$ 1.28	$5.76	3.2	5.84	1.50	6.7
3.46	.34	1.3	2.67	.37	.9
5.60	.07	4.8	8.36	24.53	14.2
$10.34	$6.17	9.3	16.87	26.40	21.8

Copy neatly in straight columns and add:

2. 6.7, 8.4, 2.1

3. 25.4, 34.8, 67.9

4. 341.34, 212.63, 696.85

5. 2.15, 3.27, 5.60

Rules for Adding Decimals

To add decimals, remember these two rules:

Write the numbers to be added so that the decimal points are exactly under each other.

Put a decimal point in the answer exactly under the decimal points of the numbers added.

1. Tom walked 2.60 miles and then rode 4.15 miles on his bicycle. How far did he go in all?

2. How far is it from the school to the library?

3. How far is it from Tom's house to Jack's house?

4. How far is it from Jack's house to the church?

5. Copy and add:

			3.27	1.42	2.73
	4.31	1.43	1.04	7.31	1.60
3.50	1.40	.70	.89	1.00	.73
2.34	.38	3.26	2.46	.88	2.34

Every number in an addition example should have the same number of decimal places. Sometimes, though, you may be asked to add numbers that do not all have the same number of decimal places, as 3.2, 5.68, 7.3, and 9. When you have to copy and add such numbers, you must be very careful to keep the decimal points exactly under each other.

3.2
5.68
7.3
9.
25.18

6. Copy and add: 7.53, 1.6, 3.63, .17.

Subtracting Decimals

1. George earned $4.25 last week and spent $1.83 of it. How much did he have left?

2. Harry read in the paper that 4.25 inches of rain fell in April and 1.83 inches fell in May. How much more rain fell in April than in May?

George's Work	Harry's Work
$4.25	4.25 inches
1.83	1.83 inches
$2.42	2.42 inches

The rules for subtracting decimals are like the rules for adding decimals.

3. Copy and subtract:

7.53	8.19	9.60	9.30	15.40	7.72
2.60	3.40	3.27	2.72	8.83	2.85

4. 6.4 from 9.6

5. 3.7 from 8.3

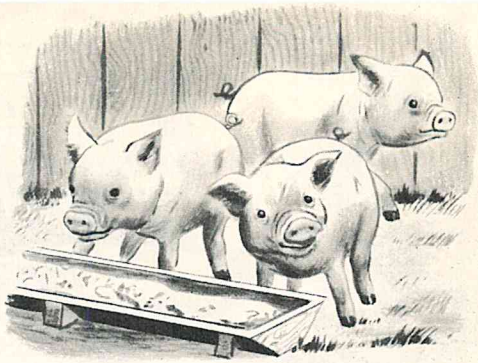
6. 8.43 from 9.68

7. 3.62 from 8.24

As in addition, the two numbers in a subtraction example should have the same number of decimal places. You may be given numbers, though, where this is not true. Then be careful to keep the decimal points exactly under each other. You think of a blank space as if it were a 0, or you may write 0's in blank spaces.

7.6	7.60		9.16	9.16	
−3.85	−3.85	or	−3.7	−3.70	or
3.75	3.75		5.46	5.46	

Decimal Problems



1. A hog raiser had two families of little pigs. One family he fed a feed including salt. To the other family he fed the same feed without salt. Each pig of the first family gained an average of 1.47 lb. daily. In the second each gained 1.07 lb. daily. How much more did an average "salted" pig gain daily?

2. Some calves were fed a special feed and gained an average of 3.6 lb. daily. Another herd was fed a mixture of corn and oats and gained only 1.2 lb. daily. What was the difference between the daily average gains?

3. In a certain state the hay crop averages 1.75 T. per acre. If one farmer raises an average of 2.47 T. per acre, how much more than the average does he raise?

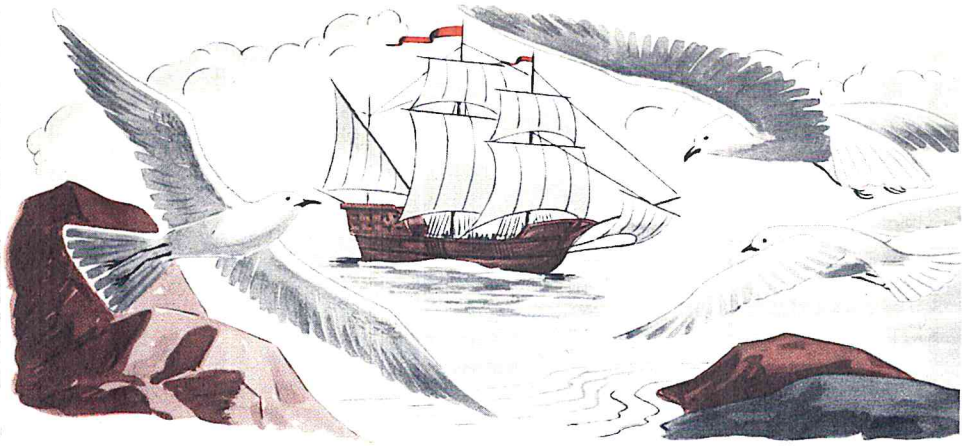
4. One very special kind of hay produced 3.55 T. per acre. The same farmer produced 2.36 T. per acre from another kind of hay. How much more was produced by the better crop?

Copy and subtract:

5. $5.39 - 1.7$ **8.** $2.46 - 1.07$ **11.** $5.5 - 1.46$

6. $9.61 - 2.4$ **9.** $9.4 - 5.59$ **12.** $7.45 - 1.8$

7. $14.9 - 8.62$ **10.** $106.5 - 90.4$ **13.** $758.9 - 46.7$



Finding How Long Ago

1. One of John's great-great-great-grandfathers came to this country on the "Mayflower" in 1620. John was born in 1944.
How many years before John was born did the Mayflower come to this country?

1944 John's birth year
1620 Mayflower came
324 years

To find the answer, you subtract 1620 from 1944. The answer is 324 years.

2. George Washington was born in 1732 and died in 1799. How old was he at the time of his death?

3. Abraham Lincoln was born in 1809. How old would he be if he were alive this year?

4. The First World War began in 1914 and the Second World War began in 1939. How many years were between the two wars?

5. Make up problems like these from your schoolbooks and give them to the class.

First Call to the Rifle Range

Keep your eye on the decimal point.

Check your work after each section.

Section I. Arrange these decimals in order of size with the largest first.

.76 .08 .7 .59 .3 .25 .9 .11

Section II. Copy and add:

1.

.3	4.5	7.9	3.25	4.90	7.76
.8	1.6	.7	1.90	2.67	5.92

2.

.4	4.3	5.6	4.13	5.11	.39
.9	2.7	.8	.80	2.36	1.04
.7	5.8	1.4	7.06	.77	.90

Section III. Copy and add:

3. .8, .7, .4, .2

4. 1.4, 3.4, 9.1, 5.7

5. 6.3, .8, 4.1, .8

6. .34, .72, .94, .81

7. 1.71, 5.67, 2.43, .56

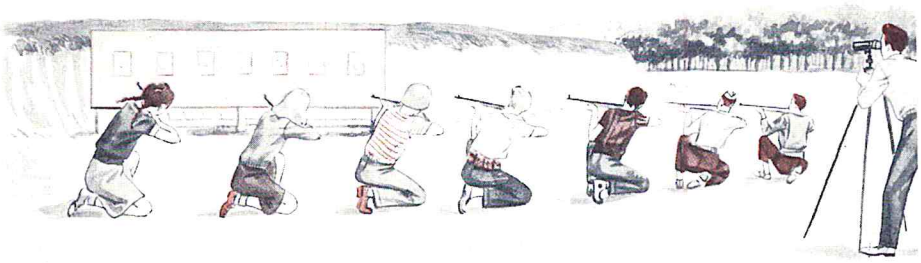
8. 3.10, 4.28, 2.91, .45

Section IV. Copy and subtract:

9.

.6	3.4	4.3	5.17	3.42	7.90
.2	1.8	.7	2.31	1.80	.63

You had 25 shots on this page. Section I counted as one shot. If you hit as many as 22 bulls-eyes, your work is on page 295. The rest will work on page 294.



Second Call to the Rifle Range

A common fraction has the same name as its denominator. The numerator tells how many parts are taken.

A decimal fraction has the same name as its understood denominator. The name of .7 is tenths, for 10 is the understood denominator. The name of .23 is hundredths, for 100 is the understood denominator.

Write the understood denominators:

1. .3 .27 .73 .4 .84 .9 .5 .05

2. .8 .01 .30 .2 .55 .8 .0 .00

3. What is the name of each decimal fraction in 1 and 2 above? You may write "t" for tenths and "h" for hundredths.

Copy and add:

4. .5, 8.9, 6.3, 1.9

5. 2.3, 4.5, .4, 1.2

6. .6, 1.0, 11.6, .9

7. 45.23, 3.47, 5.69

8. 2.13, 128.63, 47.19

9. 5.67, 4.30, 147.09

Copy and subtract:

10. 23.56 from 45.98

11. 89.70 from 136.08

12. 27.16 from 79.85

13. 13.42 from 25.76

14. 45.54 from 54.06

15. .23 from 1.10

16. 22.85 from 91.15

17. .06 from 2.15

A Sharpshooter's Page

The United States Weather Bureau has several thousand weather stations scattered all over the country and on ships at sea. Each morning and each evening these stations report to central stations, telling the rainfall, temperature, and other things. Rainfall is measured in inches and decimals of an inch.

1. Here is the average yearly rainfall in inches in six cities:

Milwaukee	30.1	Phoenix	7.8
Mobile	61.6	St. Louis	37.4
New Orleans	57.5	Washington	42.2

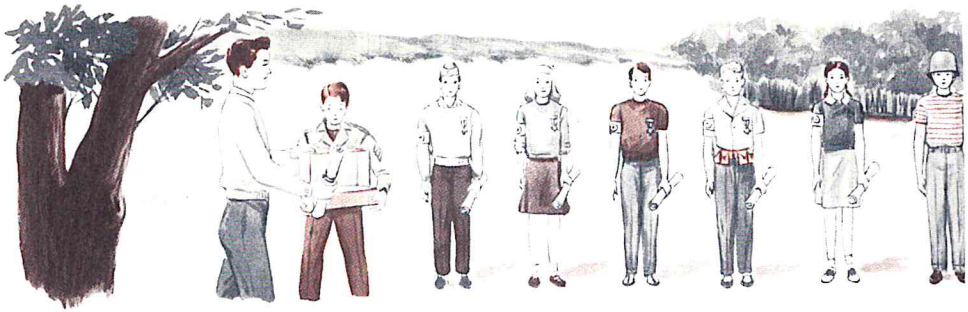
Arrange these cities according to rainfall, writing the one with the greatest rainfall first.

2. How much greater is the rainfall in Mobile than in each of the other cities?

3. Here is the monthly rainfall in inches in a large city for a recent year:

Jan.	3.48	May	3.20	Sept.	3.39
Feb.	3.66	June	3.33	Oct.	3.52
Mar.	3.77	July	4.27	Nov.	3.09
Apr.	3.66	Aug.	4.42	Dec.	3.33

In what month was the rainfall greatest? Least? What was the rainfall for the whole year?



Dress Parade—Review of Unit 11

1. Clyde walks 2.50 miles to school. Betty walks 1.75 miles. How much farther does Clyde walk?

2. Father drove 325.7 miles one day, 450.8 miles the next day, and 284.4 miles the next day. How many miles did he drive in the three days?

3. The highest point in Colorado is about 2.73 miles above sea level, and the lowest point in Colorado is about .64 miles above sea level. How much higher is the highest point than the lowest point?

4. In a motor boat race, one boat traveled at the rate of 73.17 miles per hour, and another boat at the rate of 65.36 miles per hour. How much faster did the first boat travel?

Write these decimals in figures:

5. 6 and 8 tenths

6. 9 and 17 hundredths

7. Six hundredths

8. Four and six tenths

9. Add one and six tenths, seven and three tenths, nine and four tenths.

10. Subtract fifty-eight and three tenths from seventy-one and one tenth.

Riding Along with Decimals

1. Mr. Crandell has a new car. He says he has driven it 2,467.3 mi. How can he tell this?

2. The speedometer on a car tells the number of miles and tenths of a mile that a car has gone.

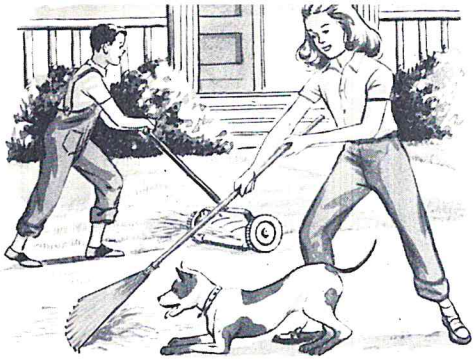
Instead of having a decimal point between the whole miles and tenths of a mile, a line is drawn to separate tenths from whole miles.

Sometimes a speedometer shows whole miles in black figures and tenths of a mile in red figures.

3. What will the speedometer read after Mr. Crandell drives another .1 mile?

4. When Mr. Crandell got home the speedometer read 2,587.9. How many miles had he driven after he said he had driven 2,467.3 mi.?

5. The Crandell family took a trip. When they left home the speedometer read 2,612.7. When they got home again it read 4,365.8. How many miles did they ride on their trip?



Review of Steps in Problem Solving

1. Some problems are worked in one step. Other problems may be solved in two steps.

Jerry bought 2 cans of dog food at 9¢ a can and a dog collar for 25¢. How much did he spend?

First Step—
What did the dog food cost?

9¢
x2
18¢ cost of 2 cans

Second Step—
How much did he spend?

18¢ for dog food
+25¢ for collar
43¢ in all

2. Sometimes a problem has three questions. You must then take three steps to find the answer.

Jerry and Mary want to buy the dog a harness. They must earn the money. Mother paid Mary 10¢ an hour for raking leaves. She paid Jerry 15¢ an hour for cutting the grass. If Mary worked 2 hours and Jerry worked 4 hours, how much did they both together earn?

First Step—
What did Mary earn?

10¢
x2
20¢

Second Step—
What did Jerry earn?

15¢
x4
60¢

Third Step—
What did they both earn?

20¢
60¢
80¢

Jerry and Mary Step Lively

1. Before Jerry and Mary earned enough money to get the dog his license, the dog was caught and taken to the dog pound. They paid a $3.00 fine and $.50 for a license. How much was this?

2. Mary said, "We must each earn half." How much did each have to earn?

3. Mary bought 3 pounds of sugar at 5¢ a pound and 4 dozen lemons at 15¢ a dozen to make lemonade. How much did she spend?

4. Mary sold 32 glasses of lemonade at $.03 a glass and 12 glasses at $.05 a glass. How much did she get for all she sold?

5. Mary also made some fudge to sell. She bought $\frac{1}{4}$ lb. of bitter chocolate at 40¢ a pound, $\frac{1}{2}$ lb. of butter at 32¢ a pound, a bottle of milk for 9¢, sugar for 45¢. What was the cost?

6. Jerry painted the fence around Mrs. White's garden. She paid him $.05 for every foot that he painted. If the garden was 12 ft. long and 8 ft. wide, and the fence went all the way around the garden, how much did Jerry earn?

Draw a diagram of the garden.

7. If Mary and Jerry together earned $4.20, how much will they have left after they pay the fine and buy a license?

Riddles About Measures

Say or write the answers to these riddles:

1. I am $\frac{1}{4}$ of a gallon or 2 times a pint. What am I?

2. I am twice as heavy as $\frac{1}{4}$ of a pound. How much do I weigh?

3. I am 36 times an inch or 3 times a foot. What am I?

4. There are 12 like me in a year. What am I?

5. I am 2,640 feet long. What would I be if I were twice as long?

6. I am 7 times 24 hours. What am I?

7. If you put me in a bushel basket, the basket will be $\frac{1}{4}$ full. What am I?

8. I am $\frac{1}{3}$ yard or 12 times an inch. What am I?

9. If you pour me into a quart milk bottle, the bottle will be $\frac{1}{2}$ full. What am I?

Choose the right word or number.

10. A rectangle is 3 ft. by 5 ft. Its area is (8, 15, 16) sq. ft.

11. A rectangle is 4 in. by 8 in. Its perimeter is (12, 24, 32) in.

12. The distance around a rectangle is its (area, perimeter, width).

13. A rectangle is 5 in. by 8 in. Its area is 40 (sq. ft., sq. in., in.).

14. A rectangle is 5 in. by 8 in. Its perimeter is 26 (in., sq. ft., sq. in.).

Reducing Fractions

Study pages 208, 209, and 264 again.

1. Reduce these fractions to lowest terms by canceling:

$\frac{4}{12}$ $\frac{9}{18}$ $\frac{4}{10}$ $\frac{2}{100}$ $\frac{6}{36}$ $\frac{6}{30}$ $\frac{3}{24}$ $\frac{6}{15}$

Think the number that belongs in each blank. Then solve the problem.

2. There are __ hours in a day.

The baby sleeps 15 hours a day. What part of the day does he sleep? He sleeps $\frac{15}{24}$, or ?.

3. There are __ inches in a yard.

Jane used 27 inches of lace in trimming a handkerchief. What part of a yard did she use?

4. There are __ months in a year.

Tom goes to school 10 months a year. What part of the year is he in school?

5. There are __ days in September.

It rained 12 days in September. What part of the month was rainy?

6. Except in a leap year, there are __ days in February.

It snowed 21 days in February (not a leap year). What part of February was snowy?

7. There are __ qt. (dry measure) in a bu.

Jack fed his pony 2 quarts of oats. What part of a bushel was that?

8. There are __ ounces in a pound.

Mr. Lane ate 6 ounces of bacon. What part of a pound was that?

Adding and Subtracting Decimals

1. Add .9 and .6.

Donald said the sum was .15, and Ruth said the sum was 1.5. Who was right?

Ruth proved her work like this:

$$.9+.6=\frac{9}{10}+\frac{6}{10}=\frac{15}{10}=1\frac{5}{10}=1.5$$

2. Add .4 and .8. Prove answers as Ruth did.

Add the following. Prove answers as Ruth did.

3.	.7	.4	**5.**	.6	.2	**7.**	3.7	2.4
4.	.6	1.3	**6.**	1.3	2.4	**8.**	.5	1.8

Here is danger. Watch! Be careful! The numbers you are given to add may not all have the same number of decimal places.

9. Add .7, 1.46, 6.4, and .87.

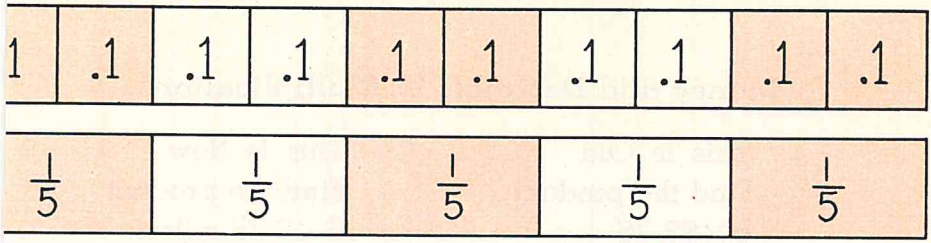
Ruth	Donald
.7	.7
1.46	1.46
6.4	6.4
.87	.87
9.43	

Look at the way Ruth copied these numbers and added. Look, too, at the way Donald copied the numbers. Ruth remembered to keep the decimal points exactly under each other, and she put the decimal point of the answer under the decimal points of the numbers added.

Donald was careless, or Donald did not know how to write numbers to be added.

Copy these numbers and subtract.

	Correct	Better Way
10. 4.15 from 6.9	6.9	6.90
11. 3.48 from 9.1	−4.15	−4.15
12. 7.2 from 8.01	2.75	2.75
13. 3.99 from 6.42		



Comparing Common Fractions and Decimals

These two strips of paper are exactly the same length. One has been divided into tenths, and the other has been divided into fifths.

1. Compare .2 and $\frac{1}{5}$ from looking at the strips.

Without looking at the strips, you could prove that .2 and $\frac{1}{5}$ are equal.

Write .2 as a common fraction and reduce to lowest terms. $\frac{2}{10} = \frac{1}{5}$

2. Compare .6 and $\frac{3}{5}$ from looking at the strips. Prove that .6 is equal to $\frac{3}{5}$ without looking at the strips.

3. Look at the strips and tell what common fraction .8 is equal to. Write .8 as a common fraction and reduce to lowest terms.

4. Change .5 to a common fraction in lowest terms. Change .25 to a common fraction in lowest terms. $\frac{25}{100} = \frac{1}{4}$

5. Change to common fractions. Reduce.

.8 .5 .4 .25 .75 .50 .45 .05 .6

6. Change these mixed decimals to mixed numbers:

1.5 2.25 3.75 1.4 4.8 3.2 5.7 2.9

Money and Decimals in Multiplication

This Is Old	This Is New
Find the product	Find the product
$6 \times \$3.75$.	6×3.75 miles.
\$3.75	3.75 mi.
x6	x6
\$22.50	22.50 mi.

When you multiply a decimal by a whole number, begin at the right and point off the same number of decimal places in the product as you had in the multiplicand.

Multiply. Point off and name each product.

1. 5×14.53 bu. 3×4.5 T. 24×98.5 mi.

2. $35 \times \$12.56$ 75×7.24 ft. 56×198.3 lb.

3. Mount Mitchell in North Carolina is about 1.3 miles high. Mount San José in Chile is about 3 times as high. How high is Mount San José?

4. Tom finished a test in 8.4 minutes. It took a fourth-grade boy twice as long to finish the test. How long did it take the fourth-grade boy?

5. It is 124.9 miles from Susan's home to her grandmother's home. Susan made the trip 16 times last year. How many miles did she travel?

6. Mother bought 3 pairs of shoes for Bob at \$3.98 a pair. How much did the three pairs cost?

7. A machinist is making pieces of machinery, each 3.98 inches long. How long are 3 pieces?

8. A metal square is 1.37 inches on a side. What is the perimeter of the square?

Dividing Dollars and Decimals

This Is Old	This Is New
Divide \$5.75 by 5	Divide 5.75 mi. by 5
\$1.15	*1.15 mi.*
5)\$5.75	*5)5.75 mi.*

When you divide a decimal by a whole number, the decimal point of the quotient is above the decimal point of the dividend.

Divide and name each quotient correctly.

1. 49.2 sec. ÷ 6 7.41 mi. ÷ 3 584.64 mi. ÷ 7

2. 8.70 min. ÷ 6 \$50.88 ÷ 8 101.7 ft. ÷ 9

3. Jane worked all her problems in 15.3 minutes. Father worked the same problems in $\frac{1}{3}$ the time. How long did it take Father?

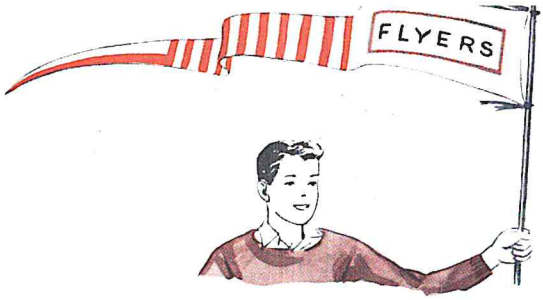
4. The speedometer on Father's car showed that he drove 549.6 miles in 24 days. As an average, how many miles did he drive a day?

5. A certain plane used 83.4 gal. of fuel in 6 hr. How much did the plane use per hour?

6. A pilot bought 60 gal. of gasoline at \$.22 a gallon and 4 gallons of oil. If his bill for all amounted to \$19.60, how much did he pay for one gallon of oil? For one quart?

7. If the cost of flying a plane 62 mi. is \$32.86, what is the average cost per mile?

8. On a flight from Chicago to Kansas City all 36 seats were filled. If the total passenger fare collected on the flight amounted to \$774.00, what was the fare for one passenger?



Pennant Races with Decimals

Choose your teams. Mark your papers at the end of each race.

Race I. Add:

1. .30, 56.78, 6.50
2. 5.46, 3.41, .28
3. 345.25, 56.75, 34.46
4. $6.59, $5.68, $0.05

Race II. Subtract:

1. 3.2 from 6.5
2. 9.27 from 13.4
3. 29.8 from 42.7
4. 263.35 from 945.57

Race III. Multiply:

1. $5 \times \$64.42$
2. $34 \times \$0.53$
3. 9×29.8
4. 25×2.37

Race IV. Divide:

1. $\$31.38 \div 6$
2. $\$7.56 \div 9$
3. $25.83 \div 7$
4. $330.8 \div 4$

Race V. Divide:

1. $\$97.15 \div 29$
2. $182.5 \div 25$
3. $382.2 \div 78$
4. $3.36 \div 24$
5. $1.95 \div 13$
6. $85.50 \div 38$

Grand Race.

1. Add 45.9, 2.5, .5.
2. Take 25.8 from 86.4.
3. $\$85.23 + \$0.63$
4. $24 \times \$7.36$
5. $\$1.74 \div 3$
6. 51×6.38
7. $24 \times \$1.98$
8. Add 1.21, 45.73, .45.
9. $\$687.24 - \$76.58$
10. $30.96 + 1.38$
11. $\$7 - \$2.67$
12. $2{,}192.32 \div 68$

In Hawaii

1. In Hawaii the temperature rarely rises above 88 degrees and seldom goes below 56 degrees. Draw a thermometer and place arrows pointing to the highest and lowest temperatures found in Hawaii.

2. Some parts of this island have an annual rainfall of 200 in. Change this to feet.

3. Hawaii was discovered by Capt. Cook in 1778. How many years ago was that?

4. Many pineapple fields yield 3 T. of fruit per acre. How many pounds would this be?

5. An average size pineapple weighs about 5 lb. How many pineapples on an average would there be in a ton?

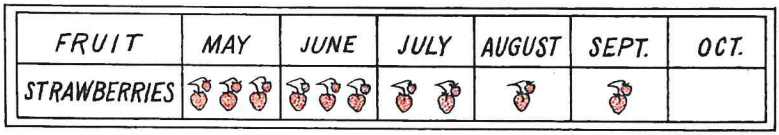
6. Sometimes a pineapple weighs as much as 20 lb. How many such pineapples would there be in a $1\frac{1}{2}$-ton load?

7. A No. 10 can holds 3 qt. of pineapple juice. How many No. 10 cans can be filled from 900 gal. of pineapple juice?

8. In one year Hawaii shipped out $47,266,417 worth of sugar. In the same year it shipped out $47,899,359 worth of pineapple products. How much greater was the value of the pineapple products?

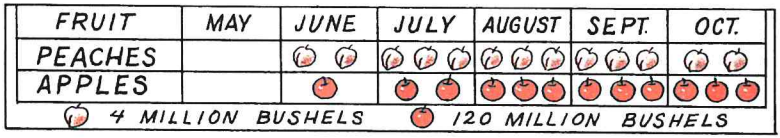
Picture Graphs

The graph below shows that strawberries are ripe in May, June, July, August, and September. There are three times as many strawberries in



May as in September. Compare the amount of strawberries on the market in June and in August. Compare the amounts on the market in June and in July.

The graphs below show when peaches and apples come from orchards to market. Each peach in the graph stands for 4 million bushels, and each apple stands for 120 million bushels.



1. How many million bushels of peaches come to market in June? In July? In August? In September? In October? In the five months shown?

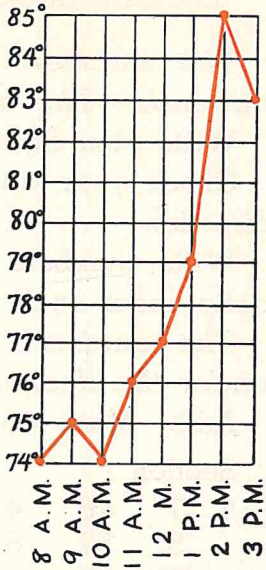
2. How many bushels of apples come from orchards to market in June? In July? In August? In September? In October? In the five months?

For Your Notebook

Look in your geography and magazines for picture graphs. Copy three interesting ones in your notebook. Be able to explain each graph.

Showing Hourly Temperatures on a Line Graph

Weather stations keep records of the temperature each hour of the day. The temperatures may be kept in table form, as below, or on a graph, as at the right.



8 A.M.	74°
9 A.M.	75°
10 A.M.	74°
11 A.M.	76°
12 NOON	77°
1 P.M.	79°
2 P.M.	85°
3 P.M.	83°

1. Draw a rectangle $3\frac{1}{2}$ inches wide and $6\frac{1}{2}$ inches high. Mark it off into squares $\frac{1}{2}$ inch on a side. Name the lines as in the graph above.

2. Make a line graph for the table above. First, put dots where the hour lines cross the temperature lines. For example, put the first dot where the 8 A.M. line crosses the 74° line, and put the second dot where the 9 A.M. line crosses the 75° line. When you have a dot for each hour, join each dot to the next one with a straight line.

3. Make a line graph for the table at the right showing temperature from 8 A.M. to 3 P.M.

8 A.M.	76°	12 NOON	78°
9 A.M.	75°	1 P.M.	83°
10 A.M.	78°	2 P.M.	85°
11 A.M.	80°	3 P.M.	81°

Looking Back Over Fifth Grade: Addition

The numbers that are added are called addends. The answer is the sum.

Write your figures carefully in straight columns.

Check your answer by adding in the opposite direction.

Write numbers so that decimal points are exactly under each other.

The decimal point of the sum is exactly under the decimal points of the addends.

Add. Mark your papers after each section.

Section I

1.

7	46	4	9	25	78	699	318
5	57	8	728	6	82	9	46
		4	63		17	97	432

2.

6	36	275	978	435	283	906
8	63	214	65	52	845	215
4	9	309	167	778	86	91
				95		467

Section II

1.

$\frac{2}{9}$	$\frac{1}{8}$	$\frac{1}{2}$	$\frac{1}{3}$	$7\frac{1}{4}$	9	$17\frac{1}{6}$
$\frac{3}{9}$	$\frac{5}{8}$	$\frac{1}{2}$	$\frac{1}{6}$	$9\frac{1}{4}$	$7\frac{3}{4}$	$6\frac{1}{3}$

2.

$3\frac{1}{2}$	$8\frac{4}{5}$	$16\frac{2}{3}$	$465\frac{1}{3}$	$\frac{1}{6}$	$\frac{1}{3}$
$5\frac{1}{8}$	$3\frac{3}{5}$	9	$223\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$
				$\frac{1}{3}$	$\frac{1}{6}$

Section III

1. .56, 4.67, 234.40

2. 72.5, .6, 17.3

3. 45.61, .23, .46

4. .5, .6, 1.3

5. .05, .45, 34.25

6. \$3.78, 76¢, \$3

Looking Back Over Fifth Grade: Subtraction

The number from which you subtract is the minuend. The number subtracted is the subtrahend. The answer is the difference or remainder.

You check subtraction by adding the remainder to the subtrahend.

Write the numbers so that the decimal points are exactly under each other. *The decimal point of the answer is exactly under the decimal points of the minuend and subtrahend.*

Subtract. Mark papers after each section.

Section I

1.	8	15	38	86	859	835	7,000
	6	7	5	55	642	427	87
2.	9	94	77	93	667	931	4,502
	3	57	68	9	29	543	1,603

Section II

1.	$\frac{3}{5}$	$\frac{3}{4}$	$\frac{3}{8}$	$8\frac{5}{9}$	$45\frac{5}{8}$	$42\frac{1}{2}$
	$\frac{1}{5}$	$\frac{1}{4}$	$\frac{1}{4}$	$2\frac{2}{9}$	$21\frac{1}{4}$	$26\frac{3}{4}$
2.	$\frac{2}{3}$	$\frac{7}{8}$	$\frac{5}{6}$	$8\frac{1}{5}$	$12\frac{1}{2}$	$57\frac{1}{3}$
	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{2}{3}$	$3\frac{1}{5}$	5	$18\frac{3}{4}$

Section III

1. 4.62 less 3.12
2. 56.57 less 4.50
3. 3427.6 − 3.3
4. 1.98 − .01
5. 100.01 less .91
6. 456.9 less 124.9
7. 47.10 − 27.01
8. 73.06 − 39.64

Looking Back Over Fifth Grade: Multiplication

The number you multiply is the multiplicand. The number you multiply by is the multiplier. The answer is the product.

Check multiplication by changing the places of the multiplicand and the multiplier and multiplying again, or by going over the work.

When you multiply a decimal by a whole number, the number of decimal places in the product is the same as the number of decimal places in the multiplicand.

Multiply. Mark papers after each section.

Section I

1.	62	81	97	856	609	700	1,002
	3	4	6	4	5	9	8
2.	85	58	86	278	243	594	2,284
	11	46	50	10	316	389	53

Section II

1.	28	54	24	560	968	725
	$5\frac{3}{4}$	$6\frac{5}{9}$	$12\frac{7}{8}$	$9\frac{5}{8}$	$45\frac{3}{4}$	$27\frac{4}{5}$
2.	72	81	54	840	726	959
	$2\frac{3}{4}$	$8\frac{1}{3}$	$6\frac{2}{3}$	$2\frac{1}{2}$	$16\frac{2}{3}$	$14\frac{2}{7}$

Section III

1.	.6	9.7	5.8	1.64	21.7	.75	.56
	2	3	12	54	32	7	42
2.	$4.20	$45.92	$0.56	$0.09	$125.64		
	4	9	6	35	48		

Looking Back Over Fifth Grade: Division

The number you divide is the dividend. The number you divide by is the divisor. The answer is the quotient.

Check division by multiplying the divisor by the quotient.

When you divide a decimal by a whole number, write the decimal point in the quotient exactly above the decimal point in the dividend.

Divide. Mark papers after each section.

Section I

1. $369 \div 6$ $560 \div 8$ $4{,}026 \div 6$ $5{,}536 \div 8$
2. $2{,}324 \div 64$ $3{,}195 \div 76$ $5{,}782 \div 34$ $4{,}536 \div 216$

Section II

1. $13\overline{)26{,}000}$ $470\overline{)10{,}810}$ $32\overline{)19{,}200}$
2. $43\overline{)172{,}086}$ $610\overline{)22{,}450}$ $79\overline{)6{,}557}$

Section III

1. $\frac{1}{4}$ of 8 $\frac{1}{2}$ of 64 $\frac{1}{5}$ of 100 $\frac{1}{3}$ of 966
2. $\frac{3}{5}$ of 10 $\frac{7}{8}$ of 80 $\frac{3}{4}$ of 60 $\frac{2}{3}$ of 210
3. $\frac{2}{3}$ of 15 $\frac{5}{6}$ of 48 $\frac{1}{6}$ of 360 $\frac{3}{8}$ of 440

Section IV

1. $35\overline{)\$700.35}$ $53\overline{)\$55.65}$ $39\overline{)\$24.18}$
2. $92\overline{)\$652.28}$ $59\overline{)\$485.57}$ $56\overline{)\$132.72}$

Section V

1. $2\overline{).80}$ $6\overline{).24}$ $8\overline{)90.4}$ $23\overline{)48.3}$
2. $7\overline{)495.6}$ $8\overline{)407.28}$ $22\overline{)2.86}$ $9\overline{)578.7}$

Looking Back Over Fifth Grade: Problems

Read the problem carefully.

Find what the problem wants you to answer.

Pick out the facts the problem gives you.

Decide whether it will take one step or more than one step to find the answer.

Decide what you must do: add, subtract, multiply, or divide.

Now work the problem.

Look carefully. Is the answer sensible?

Would these be sensible answers?

1. John was finding the height of a little girl. He found 12.2 feet as the answer.

2. Harry found that 7 pints of vinegar would fill a barrel.

3. The problem said that pencils cost 5 cents each, and asked for the cost of 7 pencils. Jack found the answer to be $3.50.

4. Ruth has a garden 9 ft. by 12 ft. She said its area was 108 sq. in.

Choose the sensible answer.

5. A typewriter costs about ($.05, $50, $5.00)

6. A small record player costs about ($29.50, $2.95, $295)

7. A scooter costs about ($4.95, $495, $4,950)

8. A house to live in costs about ($7.00, $700.00, $7,000)

Pounds per Bushel	
Corn on Cob	70
Cranberries	33
Cucumbers	60
Onions	57
Spinach	24
Wheat	60

How Much Does a Bushel Weigh?

Read this table carefully, and then work the problems.

1. A dealer bought 5.25 bu. of cucumbers. How many pounds did he buy?

2. How many bushel baskets will a farmer need to pack 1,425 lb. of onions?

3. A merchant bought 2,739 lb. of cranberries. He sold them at $8.75 a bu. How much did he get for all of them?

4. A grocer bought $3\frac{1}{2}$ bu. of spinach and sold it at 5¢ a lb. How much did he get for it?

5. Farmer Brown said he had fed his pigs 3.5 T. of ears of corn. How many pounds was this? How many bushels?

6. A grocer paid $3.50 for 2 bu. of cucumbers. He sold them at 5¢ a lb. What did he make?

7. Tom bought $\frac{1}{2}$ bu. of wheat. How many pounds should it weigh?

8. What should a farmer receive for $\frac{3}{4}$ bu. of spinach at 12¢ a lb.?

9. If a grocer bought $\frac{1}{3}$ bu. of cucumbers for $.50 and sold them at $.04 a lb., what was his profit?

10. Tom raised 480 lb. of spinach and sold it at $.56 a bu. How much did he receive in all?

11. A grocer sold $1\frac{1}{3}$ bu. of onions at $.03 a lb. How much did he get for the onions?

12. A grocer sold a bushel of cranberries at 25 cents a pound. How much did he get for them?

Hobby Day at School

The fifth-grade pupils of the Washington School had a "Hobby Day." Each pupil explained his hobby and made up problems about it.

1. Jack had made a model airplane with a wing spread of $8\frac{3}{4}$ in. John's plane measured $5\frac{1}{2}$ in. How much wider was Jack's plane?

2. Mary was knitting a scarf for the Red Cross. Her scarf was $3\frac{2}{3}$ ft. long. Alice is making a scarf, too. Her scarf is $4\frac{1}{3}$ feet long. How much longer is her scarf than Mary's?

3. Jerry brought his stamps. He had 127 U.S. stamps, 34 French stamps, 95 stamps from Africa, 213 stamps from South America and 1,254 others. How many stamps did he have in all?

4. Ellen made some handkerchiefs. She bought 2 yd. of lace for each handkerchief. If she made 6 of them, how much lace did she use?

5. Jane made a patchwork quilt. She sewed 6 squares in a row. How many squares did she need for 7 rows?

6. Bob brought 24 beautiful tomatoes which he raised in his garden. If 3 of the tomatoes made 1 lb., how many pounds did he bring?

7. Joan brought 6 doz. cookies which she baked. If there were 36 pupils in the class, how many cookies could Joan give each pupil?

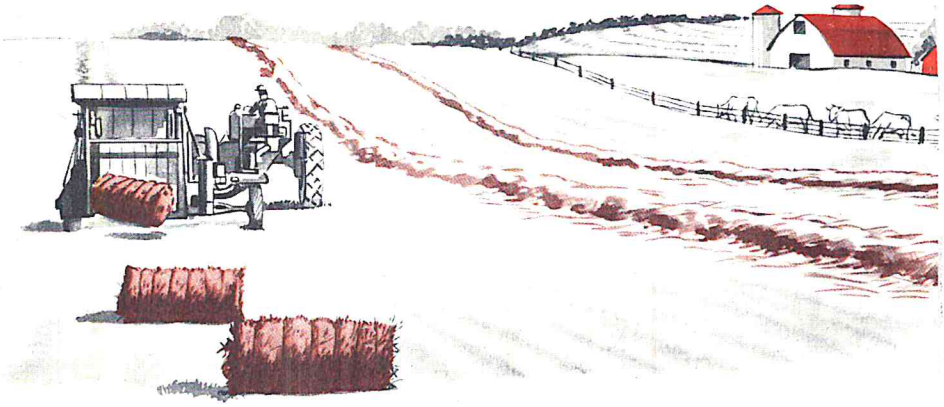
8. Harry made a sailboat. He paid $1.25 for the wood, $.35 for lead, 5¢ for cloth for the sails, and 15¢ for glue. How much did he have left from $3.00?

9. Tom brought his rainfall measure and made this problem. If there are 3.8 in. of water in the pan and I add 4.5 in. more, how deep will the water in the pan be?

10. Then he made this problem: If there are 4.6 in. of water in the pan, and I pour out 2.65 in., how deep will the water be that is left in the pan?

11. Bob drew a diagram of his garden on the blackboard. The garden was 36 ft. long and 24 ft. wide. Find the area.

12. How many feet of fencing will it take to go all around Bob's garden?



Dairy Farm Problems

1. Farmer Brown said one of his cows gave about 5.8 gal. of milk a day. How many gallons would this cow give in 7 days? In 6 weeks?

Milk is sold by the pound wholesale.

2. If 1 qt. of milk weighs about 2.15 lb., what will 68 qt. weigh? What will a gallon weigh?

3. The average cow in the U. S. gives 4,740 lb. of milk in a year. How many pounds per month is this?

4. In one year a prize cow gave 33,363.2 lb. of milk. How many pounds per week was this?

5. In 1920 a prize cow gave 37,381.4 lb. of milk. In 1936 a very fine cow gave 38,606.6 lb. of milk. How much more did the second cow give than the first?

6. In 1942 a very famous prize cow gave 21 tons of milk. How many pounds was this?

7. There are about 25 bales of hay to the ton. What does a bale of hay weigh on the average? (Hint: How many pounds are there in a ton?)

8. Farmer Brown kept a record of the amount of milk he got from his best cow. The cow gave 380.5 lb. of milk in April, 400.55 lb. in May, and 398.05 lb. in June. How many pounds of milk did this cow give in these 3 months?

9. A good cow gave 292.55 lb. of milk in one month. Another cow gave 197.3 lb. in the same month. How much more did the first cow give?

10. Tom bought a calf which weighed 65.5 lb. The next time he weighed the calf it weighed 9 times as much. How much did it then weigh?

11. Farmer Brown sold $2,514.72 worth of milk last year. On an average how many dollars' worth of milk did he sell each week?

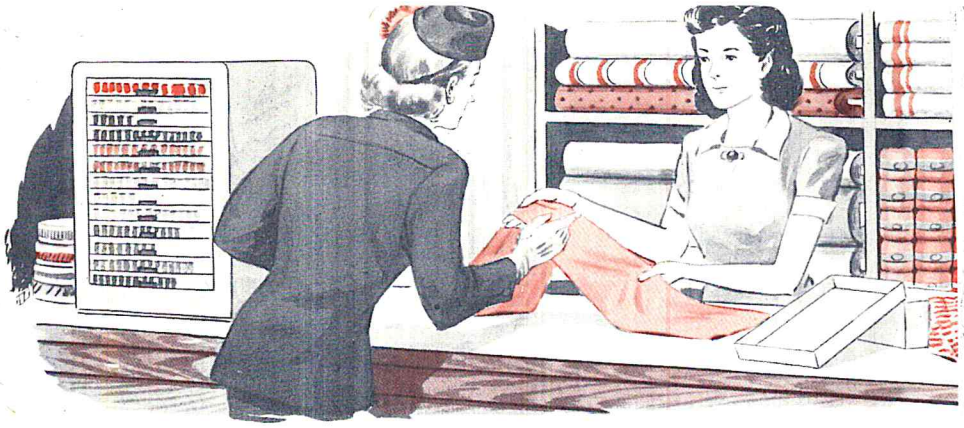
12. His neighbor sold about $56.75 worth of milk each week. At this rate, how much milk would he sell in a year?

13. He paid $31.35 for a 55-gal. drum, or steel barrel, of stock dip, which is used on cattle. How much did he pay per gallon?

14. If there are 2,000 lb. in a ton of hay, how many pounds are there in $29\frac{7}{8}$ tons?

15. Farmer Brown bought 3 dairy brushes at $.59 each, a push brush at $1.29, and 5 milk can brushes at $.24 each. What did he pay for all?

16. He bought a 38-lb. pail of cod liver oil to feed his calves. If he paid $19.38 for it, how much did he pay a pound?



Taking an Inventory of Stock

1. Ann's mother has a small dry goods store. Every few months she measures and counts all the stock she has in her store. This is called "taking stock," or "making an inventory." Can you find out something about "taking stock" by talking to your father, the garage man, the druggist, or some other person in business? Report what you have learned in your language class.

2. Ann and Jack are helping their mother. Ann measured a piece of cloth. It measured $12\frac{3}{4}$ yd. Just then her mother sold $4\frac{1}{2}$ yd. from this piece. How many yards were left?

3. A bolt of ribbon was marked $15\frac{1}{2}$ yd. Mrs. Smith bought $2\frac{3}{4}$ yd. How many yards are left?

4. Jack measured two pieces of ribbon. One piece measured $8\frac{1}{3}$ yd. The other measured $6\frac{1}{4}$ yd. He rolled them both on the same bolt. How many yards should he write on the bolt?

5. Jack counted $14\frac{5}{12}$ dozen towels. How many towels was this?

6. Ann counted $15\frac{1}{3}$ boxes of sewing thread. If there were 24 spools in each box, how many spools were there in all these boxes together?

7. Jack counted 120 balls of yarn. He found that $\frac{1}{6}$ were red, $\frac{3}{8}$ were brown, $\frac{1}{3}$ were blue, and $\frac{1}{8}$ were green. How many balls of each color were there?

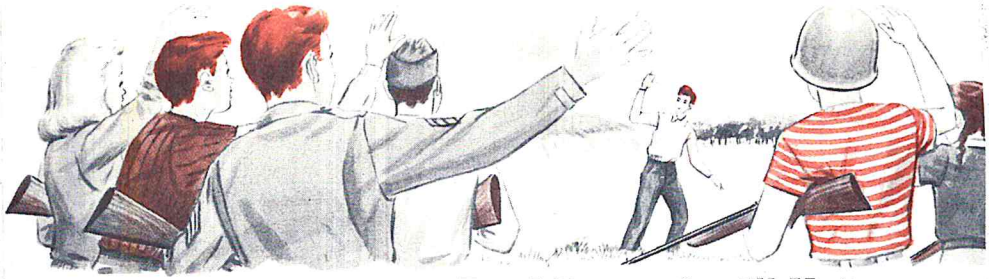
8. Jack counted the men's ties. They were packed 3 in a box. If there were 15 boxes, how many ties would Jack write on his record?

9. Mrs. Jones bought $\frac{1}{2}$ doz. bath towels and $\frac{1}{3}$ dozen linen towels. How many towels did she buy?

10. Mrs. Smith bought $\frac{1}{4}$ yd. of velvet to make a scarf. How many inches of velvet did she buy?

11. Ann counted 35 cards of bobby pins. What are all of them worth if they are marked 5¢ a card?

12. Mrs. White bought a table cloth for $10.95. She gave Ann's mother a ten-dollar bill and a five-dollar bill. What change should she receive?



Dress Parade—Final Review for All Units

1. Add 32, 453, 5, 685, and 398.
2. Subtract 459 from 7,100.
3. Multiply 875 by 409.
4. Divide 4,845 by 285.
5. Reduce each fraction to lowest terms by cancellation: $\frac{4}{6}$, $\frac{10}{12}$, $\frac{18}{24}$, $\frac{12}{72}$.
6. Add: $\frac{1}{4}+\frac{2}{3}+\frac{5}{12}=$
7. Subtract $\frac{2}{3}$ from $\frac{11}{12}$.
8. Add: $4\frac{3}{4}+7\frac{1}{2}+2\frac{7}{8}=$
9. Subtract $43\frac{3}{4}$ from $65\frac{1}{12}$.
10. Multiply 495 by $3\frac{2}{5}$.
11. Add \$7.45, \$.57, 5¢, and \$2.50.
12. Subtract \$45.78 from \$99.95.
13. Add 1.4, 3.67, .78, .2 and .05.
14. Subtract 4.56 from 82.34.
15. Subtract 1.3 from 7.95.
16. Subtract 8.09 from 35.1.
17. Write 3 inches as a fraction of a foot.
18. Reduce $\frac{75}{100}$ to lowest terms.
19. Multiply \$4.28 by 893.
20. Multiply 68.9 by 67.
21. Multiply 126.59 by 54.
22. Divide 586.5 by 3.
23. Divide \$21.75 by 75.

Tables of Measure

COUNTING

12 things = 1 dozen (doz.)
12 dozen = 1 gross (gro.)
144 things = 1 gross

LENGTH

12 inches (in.) = 1 foot (ft.)
3 feet = 1 yard (yd.)
$16\frac{1}{2}$ feet = 1 rod (rd.)
5,280 feet, or 320 rods = 1 mile (mi.)

LIQUID MEASURE

2 cups = 1 pint (pt.)
2 pints = 1 quart (qt.)
4 quarts = 1 gallon (gal.)

DRY MEASURE

2 pints = 1 quart (qt.)
8 quarts = 1 peck (pk.)
4 pecks = 1 bushel (bu.)

WEIGHT

16 ounces (oz.) = 1 pound (lb.)
100 pounds = 1 hundredweight (cwt.)
2,000 pounds = 1 ton (T.)

TIME

60 seconds (sec.) = 1 minute (min.)
60 minutes = 1 hour (hr.)
24 hours = 1 day (da.)
7 days = 1 week (wk.)
365 days = 1 common year (yr.)
366 days = 1 leap year

Special Review and Practice

There are some things in arithmetic that you must really nail down. To nail something down means to know it so well that you always do it correctly. Pages 324 – 340 will help you to nail down these important things.

Nailing Down Addition

Know the 100 basic addition facts.

1. *The sum of any number and 0 is the number.* Add 0 to each number in Row A. Say the sums quickly.

Row A. 4 7 6 3 2 0 9 8 1 5

2. *The sum of a number and 1 is the next number.* Add 1 to each number in Row A.

3. Add 2 to each number in Row A.

4. *The "doubles" are easy.* Say them quickly.

7	4	3	6	0	2	9	1	5	8
+7	+4	+3	+6	+0	+2	+9	+1	+5	+8
14	8	6	12	0	4	18	2	10	16

5. *Knowing the "doubles" makes the "near doubles" easy.* Say these sums quickly.

7	4	3	6	0	2	9	1	5	8
+8	+5	+4	+7	+1	+3	+8	+2	+6	+9

6. *The sum of 9 and a number is 1 less than the sum of 10 and the number.* The 6 in 16 is 1 less than the 7 added to 9. Add 9 to each number in Row A.

10	9
+7	+7
17	16

7. Study the addition facts below. Then cover the sums and say them quickly.

8	5	7	8	6	7	8	7	8	6
+5	+3	+4	+4	+3	+5	+6	+3	+3	+4
13	8	11	12	9	12	14	10	11	10

8. Say these sums quickly.

5	3	4	4	3	5	6	3	3	4
+8	+5	+7	+8	+6	+7	+8	+7	+8	+6

9. Do the "Workouts" on pages 9 and 10.

10. Say or write the answers on page 8. Race with a partner.

A second grader may be allowed to count things in adding. A Straight Shooter must know each addition fact so well that he can say it instantly, without any counting at all.

Know how to carry in addition.

1. Add 36 cents and 57 cents. Explain the work to a friend.

36¢ = 3 dimes + 6 cents
+57¢ = 5 dimes + 7 cents
8 dimes + 13 cents = 9 dimes + 3 cents

This is a shorter way:

Think 6 and 7 are 13. Write **3** under 7 and carry 1.

Think 1 (carried) and 3 are 4; 4 and 5 are 9. Write **9** under 5.

36¢
+57¢
93¢

2. Add 246 and 397 the shorter way. Explain the work to a friend.

246
+397
643

3. Work with a partner. Write the sums. Exchange and mark papers after each row. Work together each example that either partner misses.

A.	69¢	38	425	607	$5.43	$4.48
	24¢	45	39	208	2.29	1.08
B.	28¢	66	430	338	$2.85	$6.75
	17¢	87	190	271	1.60	.83
C.	34¢	47	268	544	$7.24	$7.89
	28¢	8	432	98	1.87	.73
D.	49¢	84	765	659	$8.37	$3.98
	5¢	36	35	50	.49	2.69

Know how to add columns.

1. Study page 12 carefully.

2. Add the following with a partner. Exchange and mark papers after each set. Work together each example that either misses.

A. Nos. 1–3, p. 12; 3, 4, p. 13; 8, 9, p. 21.

B.

2	5	9	8	9	8	9	5	5	7
5	8	6	8	6	5	8	9	4	8
9	5	6	8	9	7	6	4	3	6
8	4	5	9	3	8	9	0	7	4

C. Nos. 1, 2, p. 13; Race I, p. 18; 1, p. 24.

D. Nos. 5, 6, p. 13; Races II and III, p. 18; 9, p. 22; 1, 2, p. 23.

E. No. 1, p. 16; 3, 4, p. 23; 2–4, p. 24.

F. Nos. 2–7, p. 16; 10–13, p. 21; 3–8, p. 22; 5–10, p. 24.

G. Nos. 1–4, p. 19.

Nailing Down Subtraction

Know the 100 basic subtraction facts.

1. Knowing the addition facts helps you with the subtraction facts. Say these answers quickly.

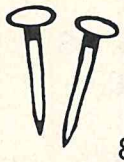
A.	8	5	13	13	C.	6	5	11	11
	+5	+8	−5	−8		+5	+6	−5	−6
B.	9	7	16	16	D.	9	4	13	13
	+7	+9	−7	−9		+4	+9	−4	−9

2. Give easy rules for finding these answers.

A.	4	6	3	9	C.	5	7	8	2
	−0	−0	−0	−0		−5	−7	−8	−2
B.	3	7	6	8	D.	12	14	16	11
	−1	−1	−1	−1		−9	−9	−9	−9

3. Do page 30. Work fast. Get every answer right.

4. Say or write the answers on page 29. Race with a partner. This is your chance to nail down the subtraction facts "for keeps."



Know how to borrow in subtraction.

1. Subtract 27 cents from 83 cents.

83¢ = 8 dimes + 3 cents = 7 dimes + 13 cents
−27¢ = 2 dimes + 7 cents = 2 dimes + 7 cents
5 dimes + 6 cents

This is a shorter way:
Think 7 from 13 is 6. Write 6 under 7.
Think 2 from 7 is 5. Write 5 under 2.

7 13
83¢
−27¢
56¢

2. Study page 31 carefully.

3. Subtract. You may need to borrow in ones place, in tens place, or in both.

783	695	839	955	534	656	432
−235	−449	−575	−382	−187	−388	−134

Know how to work with 0's in subtracting.

1. These 0's should give no trouble at all.

460	407	947	560	604	915	504
−128	−165	−308	−380	−400	−309	−144

2. Think, and these 0's will give no trouble.

```
 8 0 0
-3 4 7
-------
 4 5 3
```

Think: 800 ones = 80 tens
= 79 tens and 10 ones.

```
 800
-347
-----
 453
```

400	701	600	903	602	800	504
−206	−508	−293	−498	−306	−211	−287

1. Subtract with a partner. Exchange and mark papers after each set. Work together each example that either misses.

A. Nos. 1–6, p. 32; 3 and 4, p. 47; 4, p. 48.

B. No. 7, p. 35; 5 and 6, p. 47; 3, p. 48.

C. Pp. 36, 37; Nos. 7 and 8, p. 49.

D. Nos. 1–4, p. 35; 1–6, p. 49; 3–8, p. 50.

Subtract. Check by adding.

2.	7080	9061	8172	6075	4132	7113
	−2064	−3456	−6435	−3066	−2125	−2008
3.	7003	9004	6002	8005	4000	5000
	−2147	−3019	−2706	−4008	−1204	−2093

Nailing Down Multiplication

Know the 100 basic multiplication facts.

1. The 2-facts in multiplication are like the "doubles" in addition. Multiply each number in Row A by 2.

Row A. 4 7 6 3 2 0 9 8 1 5

2. Multiply each number in Row A by 5; by 1; by 0. Say the products quickly to a partner.

3. Write the products: 9×2, 9×3, up to 9×9, one beneath the other. Discover something interesting about these products.

4. Study the multiplication facts below. Cover the answers and say the facts quickly to a partner.

7	6	8	7	4	7	4	6	9	7
$\times 8$	$\times 4$	$\times 9$	$\times 6$	$\times 8$	$\times 3$	$\times 7$	$\times 8$	$\times 6$	$\times 9$
56	24	72	42	32	21	28	48	54	63

5. Say the products below quickly. How are these facts like those in 4, above?

8	4	9	6	8	3	7	8	6	9
$\times 7$	$\times 6$	$\times 8$	$\times 7$	$\times 4$	$\times 7$	$\times 4$	$\times 6$	$\times 9$	$\times 7$

6. Race with a partner on page 40. If you miss any answer, practice on that fact until you are sure you know it. This is your chance to nail down the multiplication facts "for keeps."

7. This is your chance to have a perfect paper. Work page 8 with a partner. Write the products (not the sums). Exchange and mark papers. Neither of you should make even one mistake.

Know how to carry in multiplication. Study page 42. Then do the races on page 43 with a partner. Exchange and mark papers after each race. Work together each example that either misses.

Know how to multiply with larger numbers.

1. Learn to use 2-figure multipliers. (44, 45)
2. Learn to use 3-figure multipliers. (56, 57)
3. Learn to use 0 in multiplying. (59, 60)
4. Learn to multiply money numbers. (61)

The races below are for partner practice. You run one race when you multiply each number in an upper row by one number in the row below it. Work as explained for page 43 above.

Races 1–9.

A:	84	13	95	67	71	48	39	52	29
B:	73	94	28	87	36	97	64	86	45

Races 10–18.

C:	90	65	72	84	53	71	30	80	67
D:	10	81	70	60	90	44	62	25	33

Races 19–25.

E:	751	293	568	523	895	673	964
F.	342	616	234	326	478	936	543

Races 26–32.

G:	418	203	945	720	189	800	600
H:	360	500	604	340	700	807	905

Races 33–38.

J:	$1.58	$3.25	$12.67	$.74	$.08	92¢
K:	7	68	246	600	420	309

Nailing Down Division

Know the even and uneven division facts.

1. Study page 65 carefully.

2. Race with a partner on page 66. Study each fact that you miss until you know it.

3. Study pages 67 and 68 carefully.

4. Divide each number in a row by the number in parenthesis at the end of the row. Say the station number, quotient, and remainder for each. Move fast. It is almost as bad for a Straight Shooter to be slow as to be wrong.

5	7	3	9	13	17	11	19	15	(2)
4	8	16	11	14	17	20	28	29	(3)
17	13	19	26	29	31	38	27	33	(4)
28	16	29	39	42	49	32	26	13	(5)
15	25	34	43	19	28	37	46	55	(6)
57	47	35	29	20	44	32	27	17	(6)
12	23	34	45	57	62	68	38	50	(7)
54	43	32	60	67	51	33	43	52	(7)
29	27	39	37	41	55	65	61	20	(7)
17	28	39	50	61	73	20	31	42	(8)
19	30	41	52	65	71	44	33	49	(8)
55	22	57	67	51	74	31	26	35	(8)
70	60	43	51	66	62	46	36	18	(8)
15	26	33	44	46	61	68	80	82	(9)
84	77	65	57	50	40	34	21	13	(9)
11	19	35	37	52	55	67	75	89	(9)
86	76	64	59	53	42	30	22	17	(9)
14	24	28	39	48	60	70	73	85	(9)

Know how to divide longer numbers.

1. Study page 69 carefully.

Test: $6\overline{)246}$ $3\overline{)189}$ $4\overline{)288}$ $7\overline{)357}$ $2\overline{)148}$

2. Study pages 70 and 71 carefully.

Test: $9\overline{)612}$ $8\overline{)512}$ $7\overline{)504}$ $6\overline{)444}$ $5\overline{)175}$

3. Study page 88 carefully.

Test: $4\overline{)\$6.28}$ $6\overline{)\$13.20}$ $5\overline{)\$9.45}$ $7\overline{)\$23.73}$

4. Study page 91 carefully.

Test: $9\overline{)487}$ $8\overline{)338}$ $4\overline{)933}$ $3\overline{)713}$ $7\overline{)515}$

5. Study page 92 carefully.

Test: $8\overline{)480}$ $6\overline{)420}$ $5\overline{)350}$ $9\overline{)450}$ $3\overline{)180}$

6. Study page 93 carefully.

Test: $8\overline{)2416}$ $6\overline{)2418}$ $9\overline{)4554}$ $7\overline{)4228}$

7. Study pages 96 and 97 carefully.

Test: $30\overline{)180}$ $70\overline{)280}$ $90\overline{)450}$ $80\overline{)480}$

8. Study page 98 carefully.

Test: $21\overline{)168}$ $41\overline{)164}$ $61\overline{)488}$ $72\overline{)288}$

9. Divide each number in a row by the number at the end of the row. Check by multiplying.

248	336	\$7.68	499	640	5624	(8)
240	540	300	480	420	3600	(60)
287	301	\$9.73	420	229	3542	(7)
217	279	124	248	186	1550	(31)

Know how to find and test the quotient figures.

1. You divide to find a quotient figure and multiply to prove that the quotient figure is correct. In the examples below, the guide figures for dividing are bold. The quotient and the proof are ghost figures.

2	3	5	4	5
4)96	8)256	70)350	42)168	97)485
8	24	350	168	485

2. Challenge a friend to do a row on pages 99 – 108. While he works, you will do a row on the same page. When you have finished, exchange and mark papers. Do together each example that either misses. Continue this practice until you can do any row correctly and quickly.

3. A quotient may have two or more figures. Study pages 109 and 123. Practice with a partner on pages 110, 111, and 114. Use the plan given in 2 above.

4. The quotient figure you find by dividing the guide figures may be too large. Study pages 116, 117, 120, and 121.

5. Practice with a partner on pages 116 – 122. Use the plan described in 2 above.

6. Pages 128 and 129 will help you divide by the "teens." Study the examples that are worked. Ask a friend to explain any part you do not understand. Use the plan given in 2 above for the practice.

Know about these things.

1. There may be a remainder at the end of a division. Study page 91.

2. A remainder at the end may be written as a fraction. Study page 226.

3. There may be a zero at the end of a quotient. Study page 92. Work these examples.

A. $8\overline{)480}$ $7\overline{)564}$ $4\overline{)2521}$ $23\overline{)460}$ $38\overline{)772}$

B. $6\overline{)365}$ $5\overline{)200}$ $9\overline{)363}$ $42\overline{)861}$ $16\overline{)488}$

4. There may be a zero within the quotient. Study page 93. Work these examples.

A. $7\overline{)2114}$ $9\overline{)3660}$ $28\overline{)5740}$ $63\overline{)44355}$

B. $8\overline{)3256}$ $6\overline{)5445}$ $32\overline{)16288}$ $45\overline{)26276}$

5. Can you divide money numbers? Study pages 88 and 166. Divide each number in a row (below) by the number at the end of the row.

A. \$1.60 \$.72 \$12 \$17.20 \$100 (8)

B. \$720 \$2.88 \$24 \$153.60 \$.96 (48)

6. When a division example is incorrect, the mistake may be in division, in multiplication, or in subtraction. See if there is a mistake in any of the examples below.

A
$$\begin{array}{r} 23 \\ 76\overline{)1848} \\ 162 \\ \hline 228 \\ 228 \\ \hline \end{array}$$

B
$$\begin{array}{r} 43 \\ 84\overline{)3512} \\ 336 \\ \hline 252 \\ 252 \\ \hline \end{array}$$

C
$$\begin{array}{r} 81 \\ 37\overline{)2797} \\ 296 \\ \hline 37 \\ 37 \\ \hline \end{array}$$

Nailing Down Your Fractions

If you do not know the meaning of a word given in the following list, you will find help on the pages given in parentheses after the word.

denominator (195–6)
fraction (83, 193)
numerator (195–6)
terms of a fraction (196)
proper fraction (210)
improper fraction (210)
mixed number (212)
like fractions (204)
unlike fractions (229)
common denominator (229)

If you need help on any of the following exercises, study the pages given in parentheses.

1. Write ten mixed numbers. (212)

2. Write ten improper fractions. (210–211)

3. Write these improper fractions as whole numbers.

$\frac{6}{2}$ $\frac{12}{3}$ $\frac{8}{4}$ $\frac{10}{5}$ $\frac{15}{3}$ $\frac{16}{8}$ $\frac{24}{6}$ $\frac{18}{2}$

4. Reduce these fractions to lowest terms. (209, 264)

$\frac{3}{9}$ $\frac{4}{12}$ $\frac{8}{18}$ $\frac{16}{24}$ $\frac{18}{36}$ $\frac{15}{20}$ $\frac{14}{24}$ $\frac{9}{30}$

5. Always write the fraction part of any answer in lowest terms. This is *best form* for the answer. Write these numbers in best form.

$\frac{2}{10}$ $\frac{12}{36}$ $\frac{15}{24}$ $\frac{21}{36}$ $5\frac{3}{6}$ $7\frac{6}{10}$ $19\frac{9}{12}$

6. Change the following improper fractions to mixed numbers. (212)

$\frac{27}{5}$ $\frac{14}{3}$ $\frac{17}{2}$ $\frac{6}{4}$ $\frac{9}{6}$ $\frac{21}{12}$ $\frac{30}{4}$ $\frac{15}{8}$ $\frac{18}{12}$

7. From the following copy the groups of fractions having a common denominator. (229–30)

$\frac{1}{4}, \frac{3}{4}$ $\frac{7}{12}, \frac{5}{12}, \frac{11}{12}$ $\frac{3}{4}, \frac{1}{2}$ $\frac{5}{6}, \frac{1}{3},$ $\frac{5}{8}, \frac{7}{8}$

Know how to add and to subtract like fractions. When you need help, study the pages given in parentheses. Write each answer in best form.

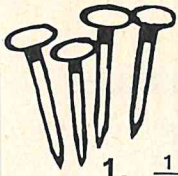
Add. (204–205; 210–214)

1.	$\frac{1}{6}$	$\frac{3}{10}$	$\frac{5}{12}$	$\frac{3}{9}$	$\frac{5}{16}$	$\frac{7}{12}$	$\frac{11}{24}$	$\frac{13}{36}$
	$\frac{4}{6}$	$\frac{6}{10}$	$\frac{2}{12}$	$\frac{4}{9}$	$\frac{8}{16}$	$\frac{4}{12}$	$\frac{6}{24}$	$\frac{16}{36}$
2.	$\frac{2}{9}$	$\frac{1}{6}$	$\frac{2}{16}$	$\frac{4}{12}$	$\frac{5}{24}$	$\frac{11}{36}$	$\frac{3}{16}$	$\frac{21}{36}$
	$\frac{2}{9}$	$\frac{1}{6}$	$\frac{5}{16}$	$\frac{1}{12}$	$\frac{4}{24}$	$\frac{7}{36}$	$\frac{7}{16}$	$\frac{3}{36}$
	$\frac{1}{9}$	$\frac{3}{6}$	$\frac{4}{16}$	$\frac{2}{12}$	$\frac{8}{24}$	$\frac{5}{36}$	$\frac{3}{16}$	$\frac{7}{36}$
3.	$\frac{3}{6}$	$\frac{8}{10}$	$\frac{7}{10}$	$\frac{7}{12}$	$\frac{19}{24}$	$\frac{9}{16}$	$\frac{11}{16}$	$\frac{25}{36}$
	$\frac{3}{6}$	$\frac{5}{10}$	$\frac{9}{10}$	$\frac{8}{12}$	$\frac{10}{24}$	$\frac{7}{16}$	$\frac{7}{16}$	$\frac{20}{36}$

4. Work examples 2–5, page 210, with a partner.

Subtract. (248–249)

5.	$\frac{7}{9}$	$\frac{8}{10}$	$\frac{15}{16}$	$\frac{8}{24}$	$\frac{12}{36}$	$\frac{11}{12}$	$\frac{13}{24}$	$\frac{10}{16}$
	$\frac{2}{9}$	$\frac{5}{10}$	$\frac{8}{16}$	$\frac{3}{24}$	$\frac{5}{36}$	$\frac{6}{12}$	$\frac{8}{24}$	$\frac{3}{16}$
6.	$\frac{8}{9}$	$\frac{9}{10}$	$\frac{21}{24}$	$\frac{15}{16}$	$\frac{10}{12}$	$\frac{31}{36}$	$\frac{11}{16}$	$\frac{20}{24}$
	$\frac{2}{9}$	$\frac{4}{10}$	$\frac{9}{24}$	$\frac{5}{16}$	$\frac{4}{12}$	$\frac{7}{36}$	$\frac{7}{16}$	$\frac{5}{24}$
7.	$\frac{5}{6}$	$\frac{6}{12}$	$\frac{10}{16}$	$\frac{9}{12}$	$\frac{25}{36}$	$\frac{19}{24}$	$\frac{35}{36}$	$\frac{13}{16}$
	$\frac{1}{6}$	$\frac{2}{12}$	$\frac{2}{16}$	$\frac{5}{12}$	$\frac{10}{36}$	$\frac{1}{24}$	$\frac{5}{36}$	$\frac{5}{16}$
8.	$\frac{7}{9}$	$\frac{9}{10}$	$\frac{19}{24}$	$\frac{27}{36}$	$\frac{15}{16}$	$\frac{34}{36}$	$\frac{10}{12}$	$\frac{17}{24}$
	$\frac{1}{9}$	$\frac{1}{10}$	$\frac{11}{24}$	$\frac{21}{36}$	$\frac{3}{16}$	$\frac{22}{36}$	$\frac{7}{12}$	$\frac{9}{24}$



Know how to add and to subtract unlike fractions. Write the numerator that belongs in place of the *. (228)

1. $\frac{1}{3}=\frac{*}{24}$ $\frac{7}{8}=\frac{*}{16}$ $\frac{2}{3}=\frac{*}{36}$ $\frac{3}{4}=\frac{*}{24}$ $\frac{4}{5}=\frac{*}{10}$ $\frac{5}{8}=\frac{*}{16}$

2. $\frac{5}{6}=\frac{*}{24}$ $\frac{7}{12}=\frac{*}{24}$ $\frac{11}{12}=\frac{*}{36}$ $\frac{2}{3}=\frac{*}{24}$ $\frac{7}{8}=\frac{*}{24}$ $\frac{5}{8}=\frac{*}{16}$

Find the common denominator for each set of fractions. (229, 236)

3. $\frac{3}{4}, \frac{5}{12}$ $\frac{1}{4}, \frac{5}{6}$ $\frac{1}{2}, \frac{3}{10}, \frac{4}{5}$ $\frac{3}{4}, \frac{5}{12}, \frac{2}{3}$

Add. Write sums in best form. (229–230)

4.

$\frac{1}{4}$	$\frac{2}{3}$	$\frac{3}{5}$	$\frac{1}{6}$	$\frac{5}{8}$	$\frac{1}{3}$	$\frac{5}{24}$	$\frac{1}{6}$
$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{10}$	$\frac{5}{12}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{12}$	$\frac{3}{4}$

5.

$\frac{5}{8}$	$\frac{1}{10}$	$\frac{1}{6}$	$\frac{9}{16}$	$\frac{7}{8}$	$\frac{5}{6}$	$\frac{7}{12}$	$\frac{11}{12}$
$\frac{1}{4}$	$\frac{2}{5}$	$\frac{7}{12}$	$\frac{1}{8}$	$\frac{2}{3}$	$\frac{3}{4}$	$\frac{5}{6}$	$\frac{7}{8}$

6.

$\frac{1}{3}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{5}{6}$	$\frac{4}{5}$	$\frac{9}{10}$	$\frac{5}{6}$	$\frac{11}{16}$
$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{2}$	$\frac{2}{3}$	$\frac{1}{2}$	$\frac{1}{5}$	$\frac{3}{4}$	$\frac{5}{8}$
$\frac{1}{6}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{5}{8}$	$\frac{3}{10}$	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{2}$

Subtract. Write answers in best form. (258)

7.

$\frac{3}{8}$	$\frac{4}{5}$	$\frac{3}{5}$	$\frac{5}{6}$	$\frac{3}{4}$	$\frac{11}{16}$	$\frac{2}{3}$	$\frac{17}{24}$
$\frac{1}{4}$	$\frac{3}{10}$	$\frac{1}{2}$	$\frac{5}{12}$	$\frac{1}{6}$	$\frac{5}{8}$	$\frac{5}{9}$	$\frac{5}{8}$

8.

$\frac{7}{8}$	$\frac{3}{4}$	$\frac{5}{8}$	$\frac{7}{8}$	$\frac{3}{4}$	$\frac{5}{6}$	$\frac{3}{8}$	$\frac{8}{9}$
$\frac{3}{16}$	$\frac{1}{9}$	$\frac{1}{3}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{11}{24}$	$\frac{5}{16}$	$\frac{1}{4}$

9.

$\frac{3}{4}$	$\frac{5}{9}$	$\frac{2}{3}$	$\frac{5}{6}$	$\frac{7}{16}$	$\frac{15}{16}$	$\frac{5}{6}$	$\frac{3}{4}$
$\frac{7}{12}$	$\frac{1}{36}$	$\frac{5}{8}$	$\frac{1}{2}$	$\frac{1}{8}$	$\frac{1}{2}$	$\frac{5}{9}$	$\frac{2}{3}$

10.

$\frac{7}{12}$	$\frac{5}{6}$	$\frac{3}{4}$	$\frac{1}{3}$	$\frac{3}{5}$	$\frac{8}{9}$	$\frac{5}{8}$	$\frac{11}{12}$
$\frac{1}{2}$	$\frac{1}{4}$	$\frac{5}{12}$	$\frac{1}{24}$	$\frac{1}{2}$	$\frac{2}{3}$	$\frac{1}{6}$	$\frac{5}{8}$

Know how to add mixed numbers.

Add. Write sums in best form. (233–235)

1.

$4\frac{5}{8}$	$7\frac{1}{4}$	$9\frac{1}{5}$	$1\frac{7}{10}$	$15\frac{5}{16}$	$12\frac{7}{12}$
$2\frac{1}{8}$	$5\frac{1}{4}$	$4\frac{3}{5}$	$5\frac{1}{10}$	$4\frac{3}{16}$	$14\frac{1}{12}$

2.

$1\frac{1}{2}$	6	$45\frac{5}{6}$	$23\frac{7}{16}$	$81\frac{3}{4}$	$56\frac{5}{24}$
3	$3\frac{7}{8}$	8	35	6	31

3.

$5\frac{1}{6}$	$7\frac{3}{8}$	$8\frac{4}{5}$	$17\frac{5}{9}$	$18\frac{7}{8}$	$12\frac{2}{3}$
$2\frac{5}{6}$	$9\frac{5}{8}$	$6\frac{3}{5}$	$10\frac{6}{9}$	$5\frac{4}{8}$	$11\frac{2}{3}$

4.

$5\frac{1}{2}$	$3\frac{1}{5}$	$6\frac{1}{3}$	$7\frac{3}{8}$	$8\frac{5}{12}$	$4\frac{3}{16}$
$2\frac{1}{4}$	$6\frac{3}{10}$	$7\frac{1}{6}$	$4\frac{1}{4}$	$9\frac{1}{3}$	$5\frac{5}{8}$

5.

$4\frac{2}{3}$	$8\frac{4}{5}$	$9\frac{1}{2}$	$3\frac{5}{6}$	$7\frac{3}{4}$	$6\frac{7}{12}$
$9\frac{3}{4}$	$5\frac{7}{10}$	$8\frac{5}{6}$	$6\frac{11}{12}$	$4\frac{1}{2}$	$8\frac{2}{3}$

6.

$6\frac{1}{2}$	$4\frac{2}{3}$	$7\frac{1}{5}$	$6\frac{1}{4}$	$9\frac{3}{8}$	$24\frac{5}{9}$
$4\frac{1}{4}$	$1\frac{5}{6}$	$3\frac{1}{2}$	$4\frac{1}{6}$	$7\frac{2}{3}$	$11\frac{3}{4}$
$2\frac{2}{3}$	$4\frac{1}{2}$	$4\frac{7}{10}$	$3\frac{3}{8}$	$2\frac{5}{6}$	$12\frac{2}{3}$

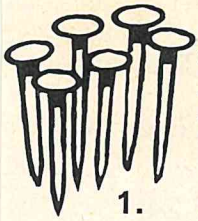
7.

$1\frac{3}{8}$	$5\frac{3}{4}$	$8\frac{3}{4}$	$5\frac{1}{2}$	$4\frac{1}{12}$	$7\frac{2}{3}$
$5\frac{3}{4}$	$6\frac{1}{2}$	$5\frac{3}{8}$	$3\frac{7}{12}$	$6\frac{5}{9}$	$5\frac{3}{4}$
$3\frac{1}{3}$	$9\frac{7}{8}$	$2\frac{5}{16}$	$1\frac{7}{8}$	$2\frac{3}{4}$	$1\frac{5}{9}$

8. A partner game: Write each of these numbers on a small piece of paper.

3 p. 234 4 p. 234 6 p. 237 2 p. 239
5 p. 239 6 p. 239 7 p. 239 9 p. 244

Draw a number. Work the examples. Exchange and mark papers. Work together each example that either misses.



To nail down subtraction of mixed numbers study the pages given in parentheses. Subtract. Leave remainders in best form.

1. (250)

$5\frac{3}{4}$	$6\frac{8}{9}$	$2\frac{7}{8}$	$9\frac{2}{3}$	$4\frac{9}{10}$	$8\frac{11}{12}$
$2\frac{1}{4}$	$5\frac{2}{9}$	$1\frac{5}{8}$	$2\frac{1}{3}$	$1\frac{3}{10}$	$5\frac{5}{12}$

2. (254–255)

8	6	$9\frac{2}{3}$	15	9	$7\frac{11}{12}$
$\frac{1}{2}$	$\frac{7}{8}$	4	$4\frac{1}{5}$	$3\frac{5}{6}$	$\frac{7}{12}$

3. (256)

$6\frac{1}{4}$	$6\frac{3}{5}$	$8\frac{1}{3}$	$7\frac{3}{8}$	$9\frac{1}{12}$	$9\frac{7}{16}$
$3\frac{3}{4}$	$2\frac{4}{5}$	$1\frac{2}{3}$	$3\frac{5}{8}$	$4\frac{5}{12}$	$6\frac{11}{16}$

4. (259)

$9\frac{1}{2}$	$6\frac{1}{4}$	$7\frac{11}{12}$	$8\frac{1}{2}$	$5\frac{3}{8}$	$8\frac{3}{8}$
$4\frac{1}{3}$	$2\frac{7}{8}$	$3\frac{1}{6}$	$4\frac{5}{16}$	$1\frac{5}{6}$	$2\frac{11}{16}$

5.

$6\frac{5}{12}$	$7\frac{1}{4}$	$7\frac{1}{2}$	$8\frac{3}{8}$	$5\frac{7}{16}$	$9\frac{1}{4}$
$3\frac{5}{6}$	$3\frac{5}{6}$	$4\frac{5}{24}$	$2\frac{3}{4}$	$1\frac{5}{8}$	$4\frac{5}{6}$

6.

$5\frac{1}{5}$	$6\frac{3}{4}$	$8\frac{7}{12}$	$15\frac{5}{9}$	$35\frac{1}{6}$	$65\frac{3}{8}$
$2\frac{9}{10}$	$3\frac{8}{9}$	$2\frac{1}{9}$	$12\frac{3}{4}$	$26\frac{5}{8}$	$32\frac{3}{4}$

7.

$53\frac{5}{6}$	$21\frac{4}{5}$	$62\frac{1}{3}$	$45\frac{1}{4}$	$36\frac{5}{24}$	$72\frac{7}{36}$
$43\frac{11}{12}$	$9\frac{9}{10}$	$34\frac{5}{8}$	$22\frac{2}{3}$	$14\frac{5}{8}$	$68\frac{5}{9}$

8. Play the partner game given on page 337. These are the numbers you will write on the small pieces of paper.

4 p. 250 6 p. 250 3 p. 254 4 p. 254
3 p. 255 4 p. 255 6 p. 256 7 p. 256
2 p. 259 4 p. 259 8 p. 261 10 p. 279

Try hard to finish first with all answers right.

Fractional Parts of Numbers and Mixed Practice

Study pages 219 – 220. Find these parts of numbers.

1. $\frac{1}{5}$ of 25 $\frac{1}{4}$ of 16 $\frac{1}{6}$ of 12 $\frac{1}{8}$ of 24

2. $\frac{2}{5}$ of 25 $\frac{3}{4}$ of 16 $\frac{5}{6}$ of 12 $\frac{7}{8}$ of 24

3. $\frac{3}{5}$ of 20 $\frac{3}{4}$ of 24 $\frac{5}{6}$ of 30 $\frac{3}{8}$ of 16

4. $\frac{2}{3}$ of 15 $\frac{5}{8}$ of 40 $\frac{4}{5}$ of 25 $\frac{5}{9}$ of 18

Remember that $\frac{2}{3}$ *of* **24** may be read as $\frac{2}{3}$ *times* **24**, and written as $\frac{2}{3}\times 24$. Find these fractional parts of numbers.

5. $\frac{2}{3}\times 24$ $\frac{3}{4}\times 40$ $\frac{3}{8}\times 32$ $\frac{5}{6}\times 18$

6. $\frac{5}{9}\times 27$ $\frac{5}{6}\times 24$ $\frac{7}{12}\times 24$ $\frac{5}{8}\times 24$

7. $\frac{3}{4}\times 32$ $\frac{2}{9}\times 18$ $\frac{4}{5}\times 35$ $\frac{2}{3}\times 21$

8. $\frac{7}{10}\times 50$ $\frac{4}{9}\times 36$ $\frac{7}{8}\times 16$ $\frac{2}{3}\times 30$

Study page 222. Find these products.

9. $2\frac{3}{4}\times 16$ $4\frac{2}{5}\times 15$ $3\frac{5}{6}\times 30$ $5\frac{2}{3}\times 30$

10. $6\frac{4}{9}\times 18$ $7\frac{1}{2}\times 14$ $7\frac{5}{8}\times 24$ $2\frac{3}{8}\times 32$

11. $5\frac{5}{6}\times 72$ $7\frac{5}{8}\times 40$ $4\frac{3}{8}\times 48$ $9\frac{3}{5}\times 15$

12. $27\frac{3}{4}\times 24$ $45\frac{3}{8}\times 40$ $21\frac{3}{4}\times 24$ $17\frac{1}{2}\times 48$

13. $26\frac{5}{9}\times 27$ $35\frac{3}{8}\times 64$ $31\frac{4}{5}\times 20$ $52\frac{3}{4}\times 32$

This is the mixed practice.

14. $\frac{7}{8}+\frac{1}{2}+\frac{3}{4}$ $\frac{4}{5}+\frac{3}{10}+\frac{1}{2}$

15. $\frac{5}{9}-\frac{1}{3}$ $\frac{5}{8}-\frac{1}{2}$

16. $14\frac{5}{16}-5\frac{5}{8}$ $21\frac{3}{8}-7\frac{11}{24}$

17. $\frac{7}{8}\times 24$ $\frac{5}{6}\times 36$

18. $3\frac{5}{6}\times 24$ $7\frac{3}{8}\times 16$

19. $24\frac{2}{3}\times 36$ $31\frac{5}{6}\times 30$

20. $11\frac{7}{9}\times 27$ $45\frac{3}{5}\times 50$

Pages 341 to 344 (Index; back cover) not required.